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SCIENCE FICTION AND FACT

JANUARY/FEBRUARY 2005

The Stonehenge Gate

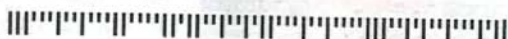
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Plus

James Gunn

Ben Bova

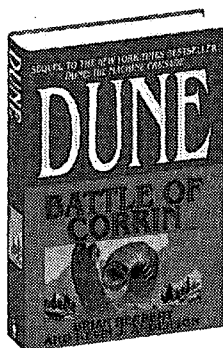
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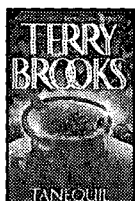
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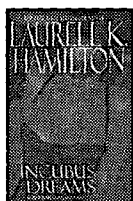


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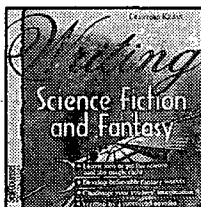
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SCIENCE FICTION AND FACT

Vol. CXXV No. 1 & 2
January/February 2005

Next Issue on Sale
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SERIAL

THE STONEHENGE GATE, Part I, Jack Williamson _____ 12

NOVELLA

UNCREATED NIGHT AND STRANGE SHADOWS, James Gunn _____ 154

A FEW GOOD MEN, Richard A. Lovett _____ 186

NOVELETES

THE SUPERSONIC ZEPPELIN, Ben Bova _____ 102

MARS OPPOSITION, David Brin _____ 120

SHORT STORIES

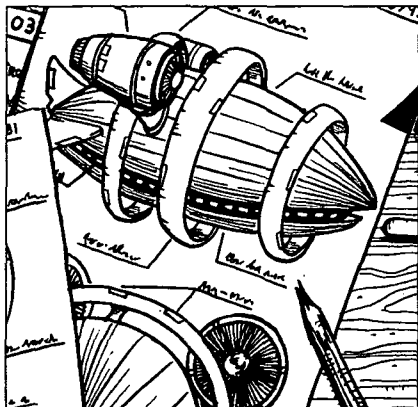
SEVENTY-FIVE YEARS, Michael A. Burstein _____ 74

ROUGH DRAFT, Kevin J. Anderson & Rebecca Moesta _____ 80

NOVA TERRA, Jeffery D. Kooistra _____ 144

SCIENCE FACT

WHERE ARE THEY?, Thomas Donaldson _____ 62



102



154

READER'S DEPARTMENTS

THE EDITOR'S PAGE	4
THE ALTERNATE VIEW, Jeffery D. Kooistra	140
THE ANALOG/ASTOUNDING PHOTO YEARBOOK, Jay Kay Klein	90
THE REFERENCE LIBRARY, Tom Easton	230
THE ANALYTICAL LABORATORY BALLOT	226
THE 2004 INDEX	227
BRASS TACKS	236
IN TIMES TO COME	225
UPCOMING EVENTS, Anthony Lewis	240

Stanley Schmidt Editor

Cover design by Victoria Green
Indicia on Page 5

Trevor Quachri Associate Editor

Cover Art by Vincent Di Fate
Online Chat Listing on Page 119

A DIAMOND MILESTONE

This issue marks the 75th anniversary of almost-continuous publication of *Analog*—a record no other science fiction magazine can approach. Born as *Astounding Stories of Super-Science* in January 1930, it went through a few minor changes of name and in 1960 metamorphosed into *Analog Science Fiction/Science Fact*, quite close to its present title. John W. Campbell, Jr., editor from 1937 until his death in 1971, is generally credited with having revolutionized the whole field of science fiction by being the first editor to insist that authors pay careful attention to both the science and the fiction in their stories. Right up to the present, *Analog* has remained one of the preeminent magazines in the field, maintaining one of the largest circulations and winning a good many awards.

People, at least in our culture, tend to mark “big” anniversaries (like multiples of 25 years) with celebration and reflection. *Analog* is no exception, and I’ve now been here long enough to go through two such occasions—in fact, it just occurred to me that I’m the first editor to do so. It gives one pause. In particular, thinking about the differences between our 50th and 75th makes me more than commonly inclined to reflect on this magazine’s long history and my relationship with it. So this one will be a bit more personal than most.

As I write this, I’ve been editing *Analog* for almost 26 years. But my connection with it goes back much farther—in a very real sense, to before my birth and

almost to the magazine’s. The first time I met John Campbell, I made him smile and grimace simultaneously by telling him, quite truthfully, that I was a third-generation reader. “It makes me feel good to hear something like that,” he explained, “but it also makes me feel old.”

Sadly, John never got very old, at least by today’s standards. But he and his magazine left a large and indelible mark on a lot of readers, and we’re always glad to see signs that the magazine is still doing that for new ones. I literally grew up with *Astounding* and *Analog*, and I need no poetic license to say that it is not only one of my best sources of entertainment, but also one of the largest and most important parts of my education. Its influence began years before I could read, when my father brought copies into our Post-World-War-II apartment. I was fascinated by the cover pictures by people like Hubert Rogers and Chesley Bonestell, even though I couldn’t read the stories they illustrated. Dad wouldn’t read them to me, either, but said I could read them myself when I was older.

And so I did, though by then I’d forgotten that prediction. When I was nine or so, Dad observed that the books I brought home from the bookmobile that visited my rural school were practically all nonfiction. “Good stuff,” he allowed, “but you should try some fiction, too.”

“I have,” I said. “It’s boring.”

“You should try some good science fiction,” he said.

"You mean that crazy stuff with the rockets and robots?" I said (having been to some extent brainwashed by the prevailing attitudes of the time).

"It's not all crazy," he said. "Try these." He handed me three volumes of old *Astoundings* (bound by his uncle) and suggested that I read what was at the book-marks.

Two Weinbaums and a Padgett later, I was hooked. (Try imagining yourself, having never seen *any* science fiction, suddenly immersed in the Venus of Stanley G. Weinbaum's "Parasite Planet"!) I began reading all I could get my hands on, in both books and magazines: Heinlein juveniles from the bookmobile, later anthologies and collections from the library when we moved close to "civilization," even current *Astoundings*. Sometimes I bought those in corner drugstores (initially for 35¢!), and some years Dad and I shared a subscription. I tried other magazines, too, and sometimes found things there that I liked.

But *Astounding/Analog* was the one for which I felt a special affinity. Its stories were *fun*, and in a very broad sense of the term, from the whimsically silly to the hauntingly evocative. Sometimes a single writer covered that whole range—for example, the Poul Anderson of *A Bicycle Built For Brew* and "Peek! I See You!" was, rather astoundingly, the same man who wrote deeply thoughtful *We have Fed Our Sea* and *The People of the Wind*. The stories were always

thought-provoking, taking the trouble to build alien worlds that felt *real* (Anne McCaffrey's Pern and Frank Herbert's *Dune* were born here), and often provocative in the sense of questioning "what everybody knew." That last tendency was even more pronounced in the fact articles, describing research at and sometimes beyond the frontiers of the generally accepted.

And then there were those editorials, in which, month after month, John Campbell took some subject on which most folks were pretty well agreed, took a stance almost (but never quiet) diametrically opposed to the prevailing view, and made a case for it that many found infuriating but frustratingly hard to refute. He drew a lot of flak from some of those, but the objections often seemed to me to stem from the mistaken assumption that he *believed* everything he said. Maybe he did; I can't prove otherwise. But my own impression (and I'm not alone in this) was that he simply enjoyed a good argument, and was willing to take and defend almost any position if it would generate one.

I could relate to that; I sometimes enjoyed doing the same thing myself. In fact, as a high school student with the oddball quirk of *liking* to write essays (as long as I could pick my own subjects), I began to envy John his job. Surely it must be fun to have a monthly soapbox where he could throw ideas into a big arena and watch how they stirred up

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thousands of readers. Furthermore, in the line of duty he got to confer, converse, and otherwise hobnob with people like Isaac Asimov, Robert Heinlein, Poul Anderson, Gordon R. Dickson, and Kelly Freas, who I suspected must be fascinating to know and talk to.

Something changed toward the end of college. Most of the way through college, majoring in physics, I simply didn't have the time to write fiction. But when I got back to it, my first new submission to John came back with an actual signed letter saying he liked my style and encouraging me to try again. In graduate school I made a determined assault, sub-

That was an exhilarating experience, and emboldened me to ask if I could visit the office when I had a good excuse to get to New York. I had two long visits with John, several months apart, once in the *Analog* office and once at his house in New Jersey. Harry Harrison once described such conversations as like “being fed through a buzz saw or a man-sized meatgrinder”; I found them more like the intellectual equivalent of a good gymnastic workout. I enjoyed them thoroughly, leaned a lot from them, and still haven’t used up all the story ideas I got from them.

I found out in a shocking way: going through my accumulated mail after a camping vacation in Maine, I opened up a newsletter from the Science Fiction Writers of America and instantly recognized a drawing of John on the first page, with the caption "John W. Campbell, Jr., 1910-1971," followed by a full-page obituary. I felt a huge sense of loss on both personal and practical levels. John, even though we had very little face-to-face contact, had occupied a large and influential role in my life. He

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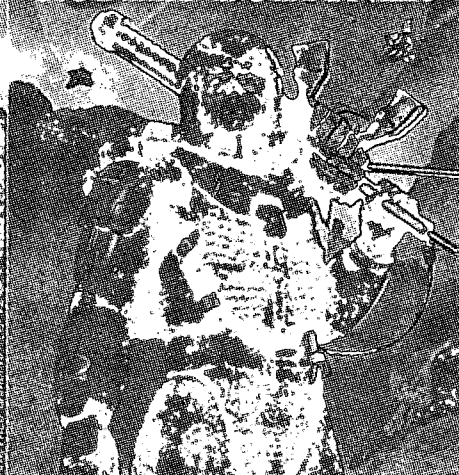
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was, in as literal a sense as one can use such a phrase, my literary father; he taught me a lot of about writing and a lot about thinking—especially about the importance of questioning. And, on the purely practical level, he was at that time the only editor who had shown any serious interest in my writing. What was to become of my embryonic literary career?

Ben Bova, that's what. Ben took over the helm a few months after John died, and to my immense relief he not only kept "my" magazine alive and growing (like many readers, I had always felt a sort of proprietary interest in it), but continued to nurture (and buy) my own writing, even encouraging me to tackle my first novels. He remained editor for seven years, but eventually succumbed to the desire to be a full-time writer. To my considerable astoundment, he nominated me to replace him here—a decision he blames partly on a visit to the college science fiction course I taught using methods stolen shamelessly from him and John. If you see more than the average amount of continuity in the character of this magazine, that's part of the reason—that, and the fact that all of us who've edited it have been fairly typical *readers* of the magazine.

Not that there *is* a "typical" *Analog* reader, of course. One of the things that has continually fascinated me about this magazine, over the years I've been on this side of the desk, is how diverse you are out there. You range literally from convicts to clergymen; you income ranges from very low to very high; some of you are very young while others have been around (and reading us) a long time. Your political views are all over the map, not just a spectrum, and you don't hesitate to make them known. I don't think there's a dull one among you, and the multifaceted "dialog" with you is an ongoing source of pleasure and stimulation.

And the writers and artists are every bit as fascinating and likable as I imag-

ined they must be. One of the rewards of this job has been that so many of those writers and artists I once knew only as faceless names became friends. The down side, which nobody warned me about, was that all too often and all too soon I've found myself writing their obituaries and condolences to their families. The compensation is the occasional thrill of discovering new writers like David R. Palmer, Joseph H. Delaney, Amy Bechtel, Michael A. Burstein, Maya Kaathryn Bohnhoff, Michael Flynn, Shane Tourtellotte, Rajnar Vajra, and many others.

It happened that I become editor right before the last of those "big" anniversaries and Ben and I agreed that the occasion called for something special. One of the things I did during that 50th anniversary year was to feature new stories by many of the writers who'd been prominently associated with the magazine over its life to that point. Some were still active, some I had to entice out of virtual retirement. They included (among others) Christopher Anvil, Isaac Asimov, L. Sprague de Camp, Gordon R. Dickson, Dr. Robert L. Forward, Raymond Z. Gallun, Laurence M. Janifer, Katherine MacLean, George R. R. Martin, Mack Reynolds, Spider Robinson, Clifford D. Simak, George O. Smith, and Jack Williamson. It occurred to me while thinking about this year's anniversary that I couldn't do the same things this time. We've lost too many. More than half the names on that list are gone, plus several others I didn't mention, like Poul Anderson and A. E. van Vogt. That's sad, but not really surprising; 75 years is a long enough period that relatively few humans who were around at the beginning of it can be expected to still be here at the end.

And in any case, science fiction is primarily about the future, not the past. Our 50th anniversary was not just to dwell on past glories, but also to celebrate the future into which we were forging ahead. Yes, we showcased a lot of prominent

writers from the magazine's past, but also others whose careers were just getting started. Even on that list I mentioned, George R. R. Martin and Spider Robinson were still fairly new and are still well known today. Others, like Steven Gould, Michael McCollum, Susan Schwartz, Marc Stiegler, and Timothy Zahn, were barely out of the starting gate.

So will it be with this 75th. We have one monumental nod to both past and future: Jack Williamson's new serial *The Stonehenge Gate*. The story would stand quite well on its own merits; it would also be quite remarkable just for the truly astounding record of its author. Jack celebrated his 96th birthday about the same time we bought *The Stonehenge Gate*; his work has appeared in this magazine in eight consecutive decades. His career is even longer; *Astounding* did not yet exist when Jack started selling. His life has gone literally from covered wagons (he was born in Arizona before it was a state) to computers. All of that makes for an impressive curiosity, but would not in itself justify buying the story. We bought it because it's *good*. The combination of such continuing quality with such a personal record, and such a direct link to the entire history of this magazine, is impressive indeed, and singularly well suited to this anniversary issue.

We do have a story by *Analog*'s former editor, Ben Bova, and we'll have Stephen L. Gillett's review of some interesting statistics about *Analog*'s evolution. But we also have those views towards the future: work by somewhat newer writers like David Brin and Kevin J. Anderson, and much newer ones like Michael A. Burstein and Richard A. Lovett. And we expect to have some more special items scattered through the coming year.

The status of science fiction, and the way it is regarded by the rest of the world, has changed dramatically, sometimes in puzzling ways, in the decades

since *Analog*'s birth. Back then, it had a decidedly unenviable reputation. It certainly wasn't taught in schools; teachers tended to look down their noses at it, often without bothering to look into it. Those who read it tended to do so surreptitiously, and were subjected to ridicule by "normal" people who found out. Even as late as my high school days, I had an English teacher who liked to periodically critique her students' choices of extracurricular reading with, "Don't go so heavy on the science fiction bit. There are so many *good* books you haven't read yet!" (Imagine my mixed feelings when I heard year later that she was teaching a science fiction course.)

By the time I was teaching full-time at a college, science fiction courses were becoming relatively common, and those who taught them sometimes published articles about them in respectable academic journals. And now we've reached a point where science fiction books not uncommonly become bestsellers, and many of the most popular movies and television shows are "science fiction."

The trouble, from the standpoint of those of us trying to do the best work we can in print, is that though much of the population is now familiar with many of the common images of science fiction, too many of them know science fiction *only* as what they see in movies and television. On one hand, it has become harder to touch a "sense of wonder" in people who have become accustomed to living in a world where many formerly science-fictional ideas have become commonplace. On the other, the ubiquity of flashy special effects has led many to view them as just one more form of pure entertainment, with no inkling that what has made the best science fiction so special is its advance exploration of real possibilities for the future—or that those new ideas are seldom found in movies or television. While working on this essay, I was interviewed by a newspaper reporter asking my opinion about the plausibility of

ANALOG

some of the “science” in a movie about to be released. Everything he mentioned—things like robots, smart cars, holograms, nanotechnology—was something already so familiar to *readers* from so many stories that I was hard put to identify one as “first.” Yet many viewers no doubt saw them first in the movie as if they were radically new ideas, and a few may have wondered which ones might actually come to pass.

One of our big challenges now is to find ways to get some of those movie-watchers to look between book and magazine covers, where the *real* new ideas usually germinate. The new Science Fiction Museum and Hall of Fame in Seattle—the first of its kind—looks like a very promising way to do this. It has many prominent writers and editors on its advisory board, has made an ad-

mirable effort to emphasize printed as well as “media” science fiction, and has launched an extensive education and outreach program through its website (www.sfhomeworld.org). We wish it lots of success, and hope it will be the beginning of a salubrious trend.

Meanwhile, *Analog* expects to continue as a leader in entertainingly exploring possible futures. People not familiar with science fiction tend to assume it has run out of idea every time something it has anticipated comes to pass, but I don't think that will happen any time soon. There are always new challenges to consider, and in some ways they tend to get bigger, not smaller, as time advances. As for me, I don't expect to still be editing *Analog* when it celebrates its centennial—but I very much hope to be reading it. ■

Personal liberty is the paramount essential to human dignity and human happiness.

—Bulwer-Lytton

Nothing is settled. Everything can still be altered.

—Claude Levi-Strauss

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SCIENCE FICTION AND FACT

CONGRATULATES THE WINNERS OF THE 2004 HUGO AWARDS

Best Novel
Paladin of Souls
Lois McMaster Bujold

Best Novella
"The Cookie Monster"
Vernor Vinge
Analog, October 2003

Best Novelette
"Legions in Time"
Michael Swanwick
Asimov's, April 2003

Best Short Story
"A Study in Emerald"
Neil Gaiman

Best Related Book
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John Grant, Elizabeth L.
Humphrey, Pamela D. Scoville

**Best Dramatic Presentation:
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*The Lord of the Rings:
The Return of the King*

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Gollum's Acceptance Speech
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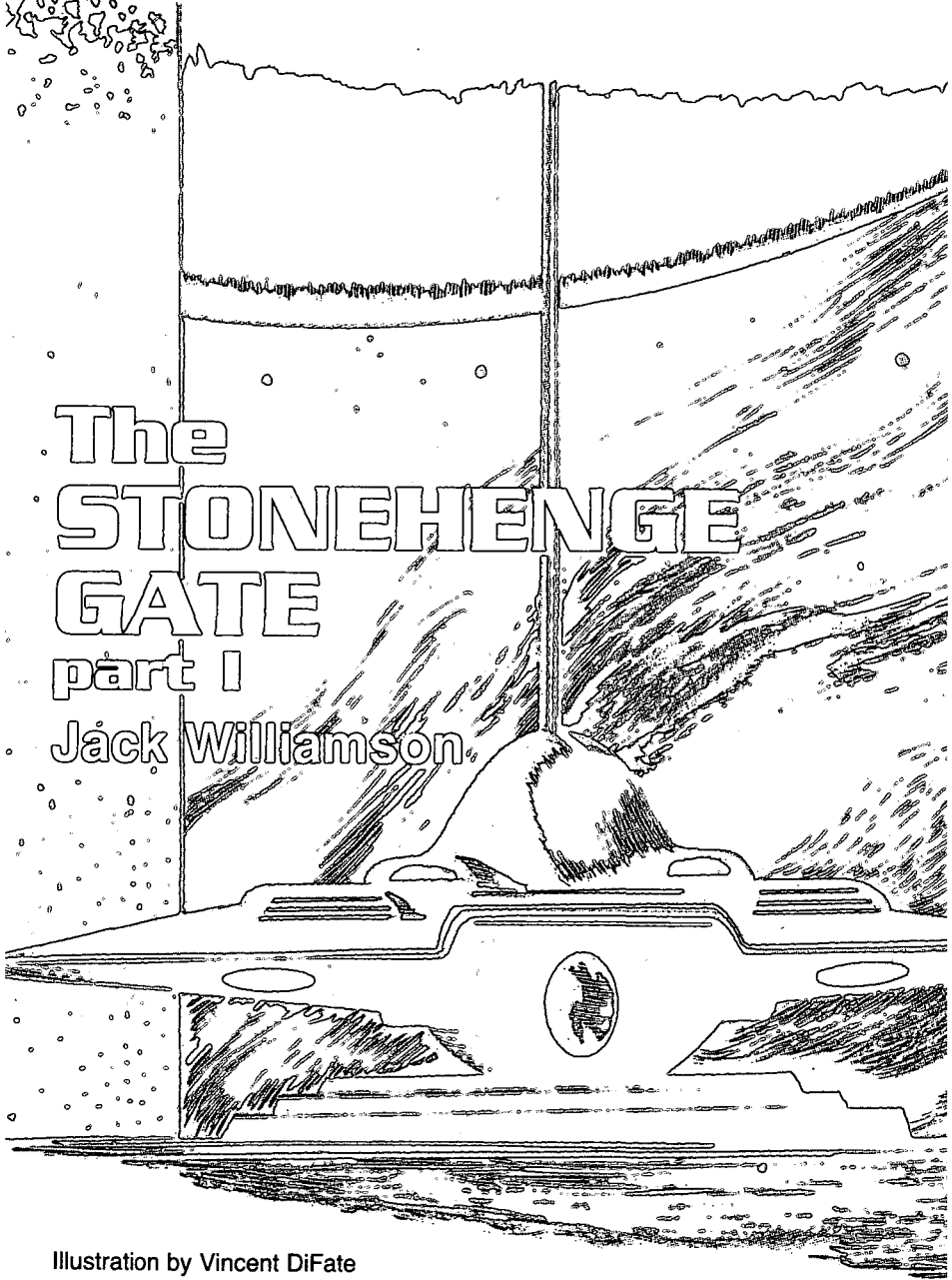
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Best Fan Writer
Dave Langford

Best Fan Artist
Frank Wu

**John W. Campbell Award for
Best New Writer**
Jay Lake



The STONEHENGE GATE

part I

Jack Williamson

Illustration by Vincent DiFate

The significance of some discoveries is far
greater than anyone could anticipate.



1.

We called ourselves the Four Horsemen, though Lupe was a woman and none of us owned a horse. We were friends and good companions. After classes on Friday we used to gather at my place for a potluck dinner and a few hands of low-limit poker.

Derek Ironcraft taught physics and astronomy. A wiry little man with keen gray eyes and sandy hair he kept too short to comb, he wore rumpled khakis to his classes and called himself an apprentice cosmologist. He spent his summer vacations as a NASA research intern and liked to surprise us with the wonders of space. Our weekly game was over, but we still sat around the table, sipping the last of our bourbon and water. He opened his briefcase to show us his latest enigma.

"We were scanning the Sahara with ground penetration radar." He spread his papers and a satellite atlas on the table. "Dry sand is pretty transparent to it, and the sand there's as dry as it gets. We got good images of old river beds and an impact crater where something big hit the Earth a few million years ago."

He pointed to a hazy blot.

"Looking for another crater, I found this. A circle of huge stones under a dozen meters of sand. It looks like an older Stonehenge, larger than the one on the Salisbury plain." He looked at Lupe. "I think it must be artificial."

"Man made?" Her black eyebrows arched. "I don't know what the Sahara was like when your meteor fell, but I know it now. Your ring of rocks may look odd, but nothing intelligent ever set them up and no hominid ever saw them."

She likes to puncture false assumptions, but that time she was wrong.

That was how it all began. Eastern is a small college in a quiet little town. We were still at home there, enjoying one another, finding adventure enough in

our work and the campus feuds and those poker dinners.

Lupe used to come with *chile verde* stew or a pot of *posole* or *menudo*. Derek brought good Kentucky bourbon. Ram brought the Indian curry his father had peddled from a cart on the street in Mombassa. A shrewd player, he sent most of his winnings back to hungry relatives in Kenya.

Lupe had come to Portales to search for bones of the first Americans at the Blackwater site, where the first Clovis points were found. She and I were most of a generation older than Ram and Derek, but she was still a lively little woman, restless as a sparrow.

She must have been a beauty once. Her fine-boned face still has a lean grace, but years of fieldwork in Yucatan and along the Great Rift of East Africa had turned her skin to tawny leather. She wore faded blue denims and a floppy field hat and spoke with a free vocabulary.

"I can do most things better than most men can," I heard her say, "except [abuse] another woman."

I'm Will White. I teach English lit.

Ram was the stranger among us. A fine physical specimen, he was six feet tall and black as the ace of spades. Eclectic in attire, he wore Western hats and boots, with colorful African shirts. He carried the genes of half a dozen races. He called himself Kikuyu, but he was named for a grandfather who had left the Punjab to avoid religious strife. He said he had a drop of Portuguese blood, and a drop of Dutch, but one great-grandmother was a mystery he had never solved.

Lupe had found him shoveling sand at her Koobi Fora dig, and brought him to the university on an athletic scholarship. He went on for a linguistics degree at Yale and came back to teach linguistics and African history. Derek and I had never been to Africa.

That poker night seems an age ago

JACK WILLIAMSON

when I look back now, but it's vivid in my memory. We all leaned over the radar image. To me it was only a blur, but Derek and Lupe had a hot debate.

"You think it's artificial? You think a human culture existed there before the Sahara was a desert? A culture that early, high enough to anticipate Stonehenge? I don't think so."

"Climates change," he told her. "The Sahara has been wet as well as dry. Haven't you heard of Farouk El-Baz? He did the pioneer research. Using penetration radar, he traced the beds of rivers that ran maybe five or six thousand years ago. People could have lived there."

"Maybe." She shrugged. "But five thousand years ago? The Neolithic hunter-gatherers had begun to settle down and farm along the Nile. In the Middle East. Maybe in China. But they weren't hauling big rocks out of nowhere."

"Let me show you." Derek leaned over his map. "See this half circle of stones? They're in a hollow where the prevailing wind has scoured the sand out to build this dune. See how they dim toward the end of the arc? That's because they're deeper down. I think the circle is complete, the rest of it buried too deep to see. Maybe half a mile across."

He looked up at Lupe.

"Dr. Vargas, what is your opinion?"

She blinked at him.

"Dr. Ironcraft, you've already heard it." She mocked his formal tone. "I think you're suddenly *poco loco*. If you've really found anything like Stonehenge, you'd be rewriting prehistory and wrecking a hundred careers. Archeology from space is a field I know nothing about, but I've seen coincidence play a lot of tricks. I'm afraid you're trying to make a very long leap from pretty flimsy evidence. Your rock formation does look remarkable, but I'd want to know who put it there. And when."

His elation dimmed, but only for a moment.

"How could it be natural? The stones are big. They all look about the same

size. They're spaced the same distance apart. Radar's not as sharp as visible light, but I got a better image of these." He pointed again. "Two taller megaliths, standing at what would be the center of the circle. It's all too symmetric to be any sort of natural formation."

She bent to squint at the image and shook her head.

"I've been over most of Africa, looking at the traces of early man. Hominids did evolve there, and spread into Asia. We've found traces over most of the continent, but none I've heard of there under the sand. The Phoenicians and Greeks never got far from the coast. Even Alexander never got beyond the temple of Amon, where he got himself made a god." She shook her head. "The Sahara has been forbidden territory."

"I'd love to see the spot, if I knew how to get there."

"I like you, Derek." Her tone was very serious. "You're a great teacher. You can run a wicked bluff when you don't hold the cards. But please don't go public with the hand you've showed us tonight. Not if you want any respect in your field. Science is a cutthroat game. It's too easy to play the fool."

"Could be I am."

He sighed and folded the map, but Ram wanted to study the image again.

"Why not take a look?"

"Here's why I can't." He opened the satellite atlas and jabbed his finger at a wide white spot that reached into three nations on a map of North Africa. "The Great Erg Oriental. The greatest sand desert on earth. Probably the most hostile spot outside of Antarctica. I doubt if that site has ever been visited, not since the sand covered it up."

Ram reached for the atlas and found the map again.

"My great grandmother came from somewhere close to there."

His lean black forefinger traced a path on the map, out of the desert and west along the coast from near the site of ancient Carthage, past Gibraltar, down

around the Sahara, and back east through the Sahel to Kenya. He had never said much about himself, and we pushed the books aside to listen.

"My father called her Little Mama." His eyes had lit as he remembered. "A strange little woman, with no name I ever knew. She lived with us in Mombasa and took care of me after my mother she died. Later, when I was only seven or eight, I tried to care for her."

Old emotion warmed his voice.

"My mother aunt accused her of *uchawi*, witchcraft. My father thought she was crazy. Maybe she was, but I loved her. And she—she loved me."

His voice quivered and he wiped at a tear.

"I knew she was dying. Of old age, I guess. She was toothless and nearly blind, wasting away to nothing. All she could eat was a little thin mealy gruel. She didn't talk much, even to me. We spoke Swahili, but she said it wasn't her language. It had no words, she said, for what she wanted to say.

"Close as we were, I never really knew her. I know there were things she never said. Something had hurt her while she was young. Hurt her so terribly that she couldn't bear to talk or even think about it. I don't think she was African."

He paused to study Lupe.

"She had a nose like yours. Her hair was just as straight, though thin and very white by then. She had an odd birthmark. It's hereditary. My father had it, and it came down to me."

He touched his forehead and turned his head for us to see the mark, which I had never noticed. A tiny thing, it was a sort of negative freckle, a pale spot in the dark pigmentation. It was a neat little rectangle with seven white dots in an arc above it.

"I don't know where she was born. She said she'd been a slave. She was still a girl when the Tuaregs caught her in the desert. I don't know how long ago, but she'd seen the Lebel rifles they took from the French army soldiers they

slaughtered at Ain Yacoub in 1928.

"They traded her to the Bela, who sold her to the Dogon, down in Mali at the edge of the Sahel. Somehow she got away. She was one tough little cookie, but there were things she wouldn't speak about. She was afraid of crowds. Afraid to sleep alone. She wanted me with her in the room day and night toward the end.

"My father tried to tell her that the Tuaregs and the Dogons were a lifetime behind her and thousands of miles away. That didn't help. She'd spent her life in terror, but she never really said what she feared. Maybe she thought we'd laugh at her. Maybe because she thought we wouldn't believe or understand. My father kept at her till she told him she'd run away from hell. He thought that it was just a sort of joke, meant to stall him off, but at the end she gave me what she said was the key.

"She said she'd stolen it to get away from Satan and all his monster demons. She said they were worse than the Bible said. That seemed an odd story, because she never prayed. Once when a Christian missionary came to the house, she called him an ignorant fool who had no idea what hell and its devils were.

"That was all she ever said, except once when she had a malaria fever. I heard her raving about *adui*, 'the enemy.' About *baba*, 'ancestors.' Something about *mfalme*, 'the king.' About 'god-folk' and the 'god-mark' and the 'god-blood.' Nothing that made any sense. I asked her about it when she got better. She shivered and said she must have been dreaming, but she gave me this the night she died."

He snapped a thin silver chain off his neck.

"She was light as a feather when I held her in my arms. Too weak to tell me much about it."

He gulped and wiped his eyes again, and passed the chain around to let us see the pendant on it. About the size of an American quarter-dollar, it had the

look of polished emerald. Derek laid it on the table and set a pocket lens over it to let us see it clearly. One face had the image of a gate in a wall, two square pillars with a lintel block across the top. The chain ran through the gate.

Lupe turned her turn at the lens and looked a little dazed.

"Ancient," she said. "Anything recent would have an arch instead of the lintel stone."

Derek turned it over. The other face had a line of sharply cut characters below the hole. Above it was the image of a crown with seven points above the band, each point tipped with a tiny circle. Lupe bent close to study it though the lens and looked up to squint at Ram's face.

"Your birthmark!" she whispered. "What does that mean?"

"You tell me." He shrugged. "Little Mama said we were marked. She said it was why she had to get away, before the demons killed her. She couldn't read the inscriptions. She called the mark 'the crown of worlds.' My father thought her whole story was a uchawi hoax she'd invented. I'd like to know."

He shook his head and hung the chain back around his neck.

"She told me to keep it, because the road to heaven runs through the gate to hell. I don't know what she meant. It stumped a jeweler when I showed it to him. He said it isn't emerald, but something he'd never seen. Hard as diamond. He wanted to send it off for evaluation, but he seemed so eager that I thought I'd never get it back."

"If she came through that gate—"

With a new enthusiasm, Derek opened his folder and spread the radar image on the table.

"If you look you can make out a shadow beside those two taller pillars." He set the lens over them. "So deep under the sand that it's hardly visible, but it has a rectangular outline. Could it have been the lintel stone before a quake knocked it off?"

Eagerly, Ram bent over the lens.

"I see it!" he whispered. "It really was a gate!"

"I'd like to know." Derek looked around at us. "If we could look. I've located that dune on a Landsat visual image. There's a faint black fleck in the hollow. It could be the top of those columns, sticking out of the sand."

"If there's a chance—" Ram caught his breath. "I want to get there, for Little Mama's sake!"

2.

We met every Friday evening through that fall semester, poring over Derek's maps and images, searching the Internet for facts about the Sahara, talking to travel agents, and playing very little poker. Still unconvinced, Lupe brought monographs on hominid evolution.

"They were growing bigger brains and learning to chip flints," she said, "but I don't think they were hiding megaliths under the Sahara."

Ram and Derek longed for a look.

"I'd go in half a minute," Ram said, "if I had the money."

Derek got Ram to let him micrograph the pendant and make spectrographic tests. Not emerald at all, it was nearly pure silicon, with traces of nickel, platinum, and copper. With no trace of iron, it was still strongly magnetic. The chain looked silver, but it was something stronger than steel.

Lupe sent the micrographs to scholars who knew cuneiform, Egyptian and Mayan hieroglyphs, and a dozen other early forms of writing. Nobody could read them.

"You're barking up the wrong tree." She lectured us as if she had us in the classroom. "I know of just one stray australopithecid fossil found in the Sahara. If they were building anything it was certainly no Stonehenge. *Homo sapiens* did appear in Africa something over a hundred thousand years ago. By the last ice age, the Cro-Magnon artists were painting their sacred caves in Spain and

France, but I can't imagine any high culture buried under the erg."

The travel agents found pilots who had flown over the Sahara, but nobody wanted to take us to Derek's site or anywhere near it. The caravan routes had always avoided the ergs. Any motor vehicle able to negotiate the dunes would cost more than we could raise. No plane could land us in the erg or take us out again. Any accident that didn't kill us would leave us stranded beyond hope of rescue.

Yet we kept on dreaming. One evening Lupe came early with enchiladas and a pitcher of margaritas. When the enchiladas were gone and the table cleared, she made Derek get out his maps and find his satellite images of the Oriental.

"If you're still determined, I'm no dog in the manger." She offered to refill the margaritas. "Radar research is out of my field, but Derek's half-circle of stones could be worth a look. Ram's pendant is still a riddle. The odds look terrible, but if we don't take chances we'll never win a pot."

"So you'll go?"

"Just for a quick look." She shrugged. "If we can get there. If we do find something worth a dig, which would amaze me, we can try to get back next summer with a bigger grant and a larger crew."

Before Thanksgiving, we'd agreed to spend the Christmas break in the Sahara. Lupe had grant funds she could tap. Derek sold his car. I got a loan on the house to stake Ram and myself.

The day after fall commencement we took off for Tunis by way of Dallas, Heathrow, and Rome. Groggy from too many hours in the air, we landed at the Djerba international airport. Ram was fluent in Arabic and good enough in French.

We spent three days with travel agents eager to show us everything. The medina, which was a cultural heritage of great historic interest. The gold souk, built in the seventeenth century. The

Great Mosque Ez-Zitouna, begun by the Umayyad rulers in 732 and finished by the Aghlabites in 864. The Souk el Attarine, which specialized in perfumes.

Some guests wished to see the site of ancient Carthage. If we were really anxious to rough it, a safari might be arranged to take us south as far as the Roman ruins at the edge of the desert, but not to the erg. It held nothing of interest. No ruins of any antiquity. Nothing alive. Nothing to film. Prudent men avoided it. Dust storms could be sudden, blinding, suffocating. Reckless adventurers had died there.

On the third day Ram found a helicopter for charter. The pilot was an Algerian who had learned to fly in the French air force. He had a satellite location system that could guide us anywhere we wanted. Ram bargained for a charter, paying a fortune in advance, with another left in escrow till he got us back to Tunis.

Rain delayed us another day, but at last we off with our gear aboard and flew south over the mountains. We stopped for fuel at Gabès, an oasis town near the coast. Beyond it, green vegetation gave way to an endless sea of bare brown dunes, empty of everything. To me, it seemed strange and lifeless as the moon.

Derek watched the global locator and studied his satellite images until at last he stopped the pilot over the giant dune that he said was our designation. To me it looked exactly like a thousand others. He kept us a long time over it, fussing with the locator.

At last the pilot set us down with our gear and a dozen cans of water on the floor of the wind-carved cup in the lee of the dune. Even through dark glasses, the sun was on the sand was blinding, the heat suffocating. The pilot took off at once, leaving us standing alone in the wind of his blades.

Squinting into the sun and rubbing the dust out of my eyes, I watched him climb. My colleagues seemed elated. Ignoring the parching heat, they pitched a

little tent and stretched the fly to make a tiny scrap of shade. Sweating under that merciless sun, I felt suddenly lost, too far from the old brown brick my grandfather built on First Street, the house where my mother was born and I grew up. I said nothing, but I couldn't help a pang of regret, a moment of sick longing for the quiet security of college life and all the activities of the new semester soon to begin.

We had a radio. The pilot had promised to return and pick us up three days later, unless we called earlier, yet I felt a stab of cold unease. What if he forgot? The others were more confident. Squatting there, they opened the box lunches we had brought from the hotel.

Derek unrolled one of his images. He said his circle of buried stones should be just north of us, under the edge of the dune. Winds had blown away the sand where we landed, down to hard brown clay. Lupe walked out across it, kicked at something, and went back to our gear for a spade and a trowel. Ram helped her dig, till she stood up to show us an odd brown stick.

"Bones!" she cried. "We're down in a dry lake bed or an old water hole. Something I never expected. Maybe worth the trip itself, if we happen on a trace of any hominid."

Derek wanted to get to his radar site, but the bones came first for her. She gave us a quick lesson in fieldwork and we spent the rest of the afternoon there. She identified an antelope horn, the skull of a giraffe, and what she thought was a warthog's jaw.

"But not a shard of pottery." She shrugged an apology at Derek. "Not a stone that might have been a tool."

Derek was fretting to move on, but suddenly she was prying out something else. A slender sliver of some glassy stuff that had a pale yellow color under the flakes of clay. She scraped them off and dug again. We were there another hour. She found another sliver and another, till she had a dozen. We helped her clean

them and fit some of them together.

"Another horn?" Ram asked her. "Or what sort of thing would have bones like that?"

"No horn." She wiped at the dust on her forehead. "But these were really bones." She lifted two yellow fragments. "The ball and socket of a joint. See how they fit. But the odd thing—" She bent to frown at them. "They're brittle, but something harder than calcium. Maybe silicon. They aren't the bones of anything I know. And these."

She picked up one of those yellow splinters and raised her dark glasses to squint at it.

"They look like shells. Too badly shattered for any reconstruction. They look like the exoskeleton of an insect, but too big to come from any insect I know. It looks worth another dig, if we can get a grant for it."

We carried the little pile of fragments back to the tent, gulped precious water, and plodded out again across the sandbank north of us. Derek kept peering at his radar image. He stopped us where he said his arc of buried stones must be. All we saw was the wind-rippled sand, but suddenly he was shading his eyes to look farther on.

"Those rocks! Let's see what they are."

They were huge, jutting five or six feet out of the sand. He had us stop for photos, and rushed us on to see them close. They were identical, two square columns of smooth black stone, some ten feet square and spaced twice as far apart.

"They're the center stones I found on the visual image." Derek squinted again at his radar map. "They stand on bedrock, under the sand. See that shadow? I think it's the lintel stone that lay across the top to frame the gate."

"Gate to where?" Lupe asked.

"To hell." Ram shrugged. "If you remember my Little Mama. My father never believed her tales, but I did when I heard them. What kind of hell I don't think she knew. She was certainly terri-

fied of whatever she thought might follow her thought the gate."

"No matter what she meant," Lupe said, "I've never seen any prehistoric stonework to match it. It should certainly get us a grant."

Derek was already tramping on to study the nearest stone. It was an odd black granite, veined with thin green streaks, perfectly squared, polished slick. He rubbed it with his finger and blinked at Lupe.

"What do you think?"

"It's impossible." She looked dazed. "I'm no geologist, but I never saw stone like this. It certainly wasn't quarried anywhere near. No culture so old ever worked stone so well."

Derek started on around the column, searching for inscriptions. Ram followed. Only a step or two behind him, I stopped to look at an odd green mark that might have been a character in some unfamiliar script. I heard him gasp. When I turned back he was gone.

"Ram!" Lupe was calling. "Ram?"

We heard no answer. We ran on around the column, then around the other. We scattered out to search the sand around us and found no footprints, no sign of him or where he had gone. We were gathering again in the shadow of the column when he came staggering back out of nowhere and fell on his face right beside me.

We dropped to our knees around him. He wasn't breathing. His skin was blue, that tiny birthmark starkly white.

His hand felt limp and lifeless when I caught it. We turned him over. I'd brought a canteen. Lupe wet her bandana and wiped the sand off his mouth and nostrils. His eyes looked glassy when she opened them. She took his pulse.

"He's alive," she whispered. "Just barely."

His chest moved. He gasped for air, coughed, and tried to sit up. We lifted him to sit against the pillar. Lupe put the canteen to his lips. He gulped, strangled,

and sat there breathing hard, his eyes closed again. It must have been an hour before he roused himself to look at us.

"Something—something happened. I don't know what."

His voice was a labored wheeze, and he had another fit of coughing before he found the breath to go on.

"The sand crumbled under me. I slid down into a dark place—I don't know where. The fall knocked my breath out. I couldn't get it back. The air—the air hurt my lungs like burning sulfur. I had to climb back up the rubble slope. Nearly—nearly passed out before I made it."

He wanted water. Lupe offered the canteen. It shook in his hands till she took it and held it to his mouth. He took a few swallows, coughed, and gave her a feeble smile.

"What was the place?" she asked him. "What did you see?"

"Not—not much." He had another fit of coughing. "It was too dark. The fumes burned my eyes. The sky—a dim red sky. Like low clouds with fire behind them. I remember great square column standing all around me. Every pair had a lintel block across the top."

"Trilithons?" she whispered. "Like Stonehenge?"

"Like gates." He nodded and stopped for another long breath. "Like this one." He touched the pendant under his thin tee-shirt. "I never saw Stonehenge, but I think this circle was bigger. A lot bigger. Seven gates, all of them open. Nothing but red sky and dark rock behind them."

He wheezed and had to cough again.

"These two stones—" He lifted his hand toward the other column and looked up at Derek. "I saw the lintel stone you found under the sand." He was gasping again. "It was back—back across them at the top."

His eyes were inflamed and tearing. He wiped at them and lay back against the column. Lupe gave him a few minutes to rest.

"Was that all?" she asked. "Can't you recall anything else?"

"Not really." He caught a long breath and blinked at her. "It took forever to get back here. That was all I thought about. I do remember a pop in my ears, like you get when a plane makes a quick change of altitude. And something like the feel you get when a fast elevator starts up. But nothing about it makes any sense."

"Or maybe it does." Eyes narrowed, Derek gazed out across the dune. "If what you felt was real—"

"It was real. Too real! It nearly killed me."

"I wonder," Derek whispered. "Could you have been somewhere off the Earth? I never believed any possible spacecraft could ever cross the distances between the stars, but that change in air pressure and gravity—"

Awe hushed his voice.

"Maybe somebody found another way across space."

"What way?" Lupe stared at him. "What way is possible?"

"The math of space and time has been a sort of quicksand since Einstein and the others found limits to Newton's laws. There are theories of wormholes between the stars, but no proof they are possible. Maybe, just maybe, we're on the brink of finding out."

"He was gone." Lupe nodded slowly. "He as almost asphyxiated. But what does that have to do with the stars?"

"I want to know." He stopped to peer at the two great stones and the dunes beyond them. "I want to know what this is. Who was here. What they did. Why they went away."

"I don't care." Ram shivered. "An ugly place. I've had nightmares, but nothing like it. We've got no business here."

3.

The air was suddenly cooler when the sun went down. Ram felt able to walk with us back to the tent, refusing any help. Lupe wanted a campfire, but there was nothing to burn. In the pale glow of an electric lantern, we ate a cold meal out of cartons and cans, and debated

what to do next.

"We'd better keep quiet about what happened to Ram," Lupe said. "What with the bones and photos of the megaliths themselves, there's enough we can carry back to get another grant. We can be back next summer with an expedition to write ourselves into history."

"Next summer?" Derek shook his head. "I don't want to wait. This thing's too big to leave alone."

"There is more we can do right now." She nodded. "Dig for more bones. And those silicon splinters. I wonder what they are."

She stared off into the dark.

"Whatever you find, don't publish too much." Ram shook his head at her. "Not if you want to come back. You could lose the site."

"Huh?" Derek blinked.

"Jealous bureaucrats. Frontiers here aren't marked on the sand. If the site's anything important, two or three nations will be clamoring to claim it as a national treasure. You'll be frozen out of the game."

"Which means we've got to learn more while we can." He turned to stare at Ram. "I've been thinking. You were somewhere. You felt that different gravity and air pressure. I think you were off the Earth. I don't know why this place was built, but there had to be a reason."

Lupe frowned at him.

"If those pillars framed some sort of gate, I want to get through it."

"Through it?" She looked blank. "How? I've walked all around both stones. So did you. Where's any gate?"

"I wonder." Derek looked toward the megaliths, lost now in the dark. "Ram was wearing his pendant. His Little Mama called it a key. We found magnetism in it. Could be it trips some kind of lock."

"The key to hell." Ram shook his head. "That's what she called it. I didn't see Satan or anything alive, but that place did have the look and sulfur stink of hell." He shivered. "You can't breathe there."

"You know—" Derek sat straighter. "We'd have to get oxygen equipment, but we can try to find out if it really is a key to anywhere. Let's call the chopper back."

"Oxygen equipment?" Ram shook his head, his dark features grim. "If you'd been there, you wouldn't be so keen about it."

I'd tried to smooth the sand under my sleeping bag, but I never found a good fit for my body. With too much to think about, I hardly slept. Up before the sun, Ram made coffee and pancakes on a propane stove while Lupe labeled her collected bones and sealed them in plastic bags. When we called the chopper pilot, Ram wanted to get out with him.

"A place we don't belong." He stared across the sand at the two great megaliths, still dark in the shadow of the dune and ominous even to me. "I don't like it here."

"It's your chance to learn who your Little Mama was," Lupe told him. "If she really got here through some kind of gate." She peered at his birthmark. "Maybe your chance to learn who you are."

He rubbed at the mark and shook his head.

"It might be better if I never know."

Yet he agreed to stay and help her at the dig while Derek and I went out to Tunis. I'd spent a year in Paris, writing a novel that never sold, before I came back home to teach English lit. With my little French and his little English, the pilot and I got on well enough. Content to assume that the megaliths were Greek or Roman, he was baffled by our interest in them. I don't think he liked the erg any better than Ram did, but the tourist season had been slow. He wanted our money.

We left Lupe and Ram at work in the dig, dwindling figures beside our tiny tent, soon lost in the sand's blinding glare. The infinite sea of star dunes caught me again with an uneasy fascina-

tion. I felt relieved to escape it, even for a day.

The engine noise made conversation difficult, but we had time to think.

"Beautiful, isn't it?" Derek raised his voice and gestured at the intricate pattern of waves on the tawny ocean of sand below, wind-carved cup and wind-piled point, wind-carved cup and wind-piled point, repeated forever. Empty of life or motion, the erg seemed as strange to me as the alien landscape Ram had glimpsed beyond the megaliths.

"Just wind and sand." He was silent for a time, gazing through the window, and turned slowly back to me, smiling with what must have been a sort of rapture. "But look at the shape of the dunes. An infinite order born out of chaos. It's a kind of natural art if you can see it. A harmony of nature, as unexpected but yet complete as the movements of a symphony."

He paused to peer at me.

"Don't you get it? The grand enigma of our universe. The joy of science, the power of math, the elation of discovery." He looked out again, speaking half to himself, yet eager to share what he felt. "That's the mystery of the natural creation. Galaxies and planets, life and mind grown from the fire and dust of the big bang. That's the enchantment of science. New vistas of wonder exploding out of every advance."

I tried to get it, but the dunes seemed more cruel than beautiful. I felt stunned by too much wonder, glad to get out of the erg and back across the mountains, cheered to see roads again and a freight train crawling around a curve, the green circles and squares of irrigated farms. Here were things men had made, things I thought I understood.

The pilot stopped at Gabès to have a mechanic check something about the engine. Dusk had fallen before we got back to our hotel. Washed free of sweat and sand, we went out for dinner. Derek found an Internet café and spent an hour on a computer.

Standing behind him, I watched math symbols flicker across the screen and glimpsed articles about dark matter and dark energy, about negative mass and negative time, about a false vacuum that might generate an infinite foam of universes. None of it meant anything to me or seemed to satisfy him.

"Nothing." At last he shrugged and quit. "If what happened to Ram is what I think it might be, most of what we think we know will all have to be rewritten."

Next morning we met the pilot at an Italian bank. Derek released the escrow to give him the balance of his fee and bargained to renew our charter. We found a supply house and I used my own credit card to buy oxygen systems. Four 35-liter units, complete with masks, cylinders, regulators, gauges, tubing, and smoke hoods.

Noon had passed before we got back across the dunes to the camp. We found Ram waiting alone beside the tent. In haste to get out before dark, the pilot dumped our crates and took off at once. I saw nothing of Lupe. When Derek asked where she was, Ram shook his head in a dazed way.

"I don't know." He stared blankly across the sand at the black megaliths, his features drawn tight. "I don't know."

Derek led him out of the sun, back into the shadow of the tent flap. I gave him a cold beer we'd brought from Gabès. Squatting on the sand, he gulped a few swallows, set the bottle down, and rubbed absently at the little white birthmark on his forehead.

"It itches," he muttered, "since I went through."

"Tell us," Derek urged him. "What became of her?"

"This morning." Peering anxiously back at the megaliths, he spoke in abrupt and disjointed phrases. "Early. We'd had breakfast. She was already down at the dig. I walked out of sight over the ridge to relieve myself. I heard her yell. Pulled my pants up. Ran back.

Saw them coming."

His head jerked toward the megaliths. His hoarse voice stopped and he stared toward them till Derek asked him to go on.

"Three." He was almost whispering. "Three monsters. Gigantic. Jumping. She tried to run. They jumped too fast."

"Monsters? What were they like?"

"Nothing on earth." He shivered and stared at the megaliths, his lean black finger on the white birthmark. "Maybe like insects. Maybe like grasshoppers, if grasshoppers could be as big as airplanes. Not much like anything. They were hideous. Spotted yellow and green. Shiny like glass. Great red eyes that blazed like fire. Long hind legs. Short front limbs with claws."

He shuddered again.

"Terrible claws. All bright metal the color of silver. Great metal jaws. And the things had wings. Stubby little wings that seemed too short. Spread when they glided. They came too fast for me. Nothing I could do."

He shoulders sagged in helpless regret.

"One of them took her. Snatched her up with those bright claws. Gone with her before I got back to the tent. Carried her back to the monuments. Crawled between them. Never came out. Took her back to the hell where I was."

He wiped at his eyes.

"No air there. No air she can breathe. I'm afraid she's dead."

"Maybe not." Derek caught his arm. "We brought the oxygen gear. We can go after her. Try to find where she is and help her if we can. If your key can take us through."

He cringed again.

"Of course." He picked up the beer and got stiffly to his feet. "If we can."

He stood a moment staring blankly down at the old water hole.

"If we can," he muttered again, and shook his head. "If she's alive." He shivered. "I—I loved her. She found me shoveling dirt at Koobi Fora. She helped get

me to college on the track scholarship. She brought me back to Africa to work with her on two more summer digs. She—well, she gave me a life.

He turned his head to hide his tears.

The western sun was already low, and the day had been exhausting. We could have rested and prepared for an early morning start, but nobody spoke of that. We uncrated three of the oxygen units and found the manuals. Printed in French and Arabic, they were brief and cryptic, but Ram deciphered them. We got the units assembled and tried them on. The smoke hoods had a sharp plastic stink and made vision difficult.

"No matter." Derek's muffled voice was hard to hear. "Not if they keep us alive."

Ram asked how long the oxygen would last.

"Depends on demand," Derek told him. "I hope it's long enough."

"To overtake those hopping things?" Ram took off the hood, wiped sweat off his forehead, shook his head. "We'll never find Lupe alive. Not in the place where I was."

"We can look," Derek said. "If those trilithons are terminal gates—" His voice trailed off, but he caught his breath and went on. "We'll go where we can. Learn what we can. Help Lupe if we can. Let's get on with it."

I longed for the comfort of a weapon, but airport security had forbidden knives or guns. We went empty handed, but the oxygen cylinders themselves made heavy burdens. We wore canteens of water clipped to our belts. I had a light backpack stuffed with a flashlight, spare batteries, a jacket, and not much else.

We ate a quick meal and set out for the megaliths. Ram led the way, grimly silent under the smoke hood. I plodded after him, sweating, half sick from the stink of the smoke hood, thinking wistfully of spring registration, only two weeks away.

Derek was exuberant.

"Don't count the odds. Win or lose, this is the greatest game men ever played."

Ram went ahead, eyes on the hoppers' footprints. They looked like the tracks of gigantic two-toed birds, pressed deep into the sand and spaced perhaps forty yards apart. He stopped us near the megaliths, pushed ahead to inspect the sand around them.

"The things came out on the west side," he said. "Went back on the east. No tracks go anywhere else. They did take her through."

He stood between us at the end of the hopper trail, the setting sun a blinding glare on our goggles. My heart was pounding. He seized my arm.

"*Moja.*" He whispered the Swahili numbers. "*Mbili. Tatu.*"

He gripped my arm so hard it hurt.

"*Nenda!* Go!"

We stepped forward together. The sun was gone. My ears clicked. The sand crumbled under me. The sudden surge of gravity dragged me down into darkness.

4.

For a few seconds the darkness was total. Feet first, I slid down a rubble slope that melted under me. Light came back, a dull red gloom. I came down hard on flat stone. Ram let go my arm. Under the weight of the oxygen cylinders I staggered for balance and tried to get my breath. I felt nauseated with the smoke hood's plastic reek.

"*Wapi?*" Ram gasped. "Where are we?"

I turned to look back. The two great megaliths stood where they had been. Or were they really still the same? Giddy for a moment, I wondered. They were far taller, the sand gone from around them. The fallen lintel stone lay back in place. Beyond them, sand dunes and sunlight had vanished. Instead I saw a dark creation of fire and violence. Flame-red clouds hung low over dead black lavas.

We all huddled close together, shut in

by the seven great trilithons. Towering all around us, they felt like the walls of a nightmare prison. The lavas beyond were a black-fanged desert, flows of it frozen on older flows, twisted into monstrous gouts, cut with bottomless crevasses. Great boulders scattered it, and shattered ejecta from volcanic explosions. Jagged mountains in the distance rose into a roof of fire-colored cloud.

I felt wrenched with a sick distress for Lupe when I tried to imagine what she must have felt when that nightmare thing snatched her out of the dig. Dazed by the shock of it, I longed for the campus, the classroom, for anything familiar. All I saw was Little Mama's hell. Derek stood a long time scanning it, and finally raised the little camera slung from his neck.

"A waterless world." Cooler than I was, he spoke as if dictating research notes. "No water in sight. No river channels. No sign of water erosion." He snapped a picture. "The atmosphere is likely nitrogen, maybe mixed with carbon dioxide and sulfur gases. Can't guess what the clouds are, but they don't make rain."

He grinned at Ram.

"We're a long way from Nairobi." He frowned again at that dark wilderness and turned to me. "Without water there's no green life. No photosynthesis to liberate free oxygen. If this is really the sort of inter-world terminal I think it must be, the site may have been selected to make a trap for trespassers. Nobody gets through without the right gear."

"My Little Mama made it through. I don't know how. Others have failed."

Ram was pointing across the thick dark dust on the floor inside the trilithons. I saw the white gleam of a human skull. He kicked at a ridge and stooped to pick the long horn of an oryx. Stirring the dust with that, he uncovered bones. An impala's skull with the graceful horns still attached, the skeleton of what he said had been a dog

or wolf, the remains of something larger, perhaps a lion.

"We need Lupe with us."

He picked up the human skull.

"She would know, but this must be Cro-Magnon. An unlucky guy that fell into the trap maybe thirty thousand years ago."

Careful with it, he laid it back in the dust. Derek pushed ahead to find another skull that Ram said was Neanderthal, and then a third that looked more modern. Ram dug into the dust around it and uncovered a bit of flint that he studied under the lenses of his smoke hood.

"A Clovis point!" His head shook under the smoke hood. "Like those from our own Black Water dig. It's the right length for a spear point. Double-edged. Fluted from the base to hold the haft. Beautiful work!"

He held it for us to see.

"Clovis?" Derek was incredulous. "How did it get here?"

"Lupe would die to know. She'd wonder if the first Americans came through here."

"That's hard to believe." Derek peered at it. "It's a far hop from here to Alaska."

"A farther hop back to New Mexico." Ram stood a moment gazing around us at the great trilithons and the dark desolation beyond them. His voice fell. "If we do get back."

We walked on, till Ram stopped to look at a long pile of older, stranger bones, buried under a thicker blanket of dust. Rib cages, backbones, leg bones, most of them puzzling even to him. Empty eye sockets mocked us from a sharp-crested skull the size of a car. A white thighbone was four feet long.

I felt chilled with a sense of the trilithons as a vast temple of death, dead and abandoned for many millennia. Could Lupe's kidnappers be its custodians, somehow here to haunt it? Shivering from too many those cold unknowns, I longed for the little riddles of Shakespeare's life, for Christopher Marlowe, Boswell and Dr. Johnson, even the

dull toil of freshman comp.

I jumped when Ram caught my arm again.

"Tracks!" He pointed across the dust and shouted at my ear, his voice muffled in the hood. "That way!"

I found the great two-toed footprints, running straight toward the opposite trilithon.

"Here!" We had come upon Lupe's wide-brimmed field hat and then her sandals. "She was alive. She tried to get away."

He'd found the prints of her naked feet. She'd run a dozen yards before her captor snatched her up again. We followed the trail to its end, between the two great columns of the trilithon. Beyond them, all I saw was that jungle of tortured lava where I thought nothing had ever walked.

"Another gate," Ram said. "It carried her through."

We huddled uncertainly there.

"Well?"

Derek looked inquiringly at Ram and me.

"She's alive," Ram said. "We must go through. If we can."

Once more we stood close together, side by side at the end of the trail. I gripped Ram's muscular arm. He counted again, this time in ringing American English. I caught my breath, stepped forward with them, felt nothing at all. No change in air pressure. No tug or lift from another planet's gravity.

Ahead of us the dead black lavas were still frozen into the same grotesque monsters. The bleak landscape beyond sloped down into the same dark canyon. I saw no possible path ahead. Behind us the trilithons stood where they had been forever, enormous against the low red sky, the only evidence that anything alive had ever been here.

What sort of life had the builders been? I felt almost afraid to know.

"If that's another gate, that's the wrong key," Derek made a dismal shrug. "We'll never find her."

We stumbled back inside the trilithons, as if they could offer any shelter from that dark hostility. Derek stopped to peer at us through the smoke mask.

"What now? What do you think?"

"Let's get out." Ram crouched away from the empty gateway where the trail had ended. "While we can."

"Not yet." Derek glanced at his oxygen gauge. "We have time left. What we've found is a fabulous pot if we get back with it."

I was looking back the way we had come. He frowned at me anxiously.

"Can't you get what it means? Not just for us. Not just for Lupe. It's new science. It's a new universe I don't understand. We've got to get back with every fact we can."

"We could lose it all." Muffled in the smoke mask, Ram's voice was grim. "In half a minute, if those monsters come back."

"Or even if they don't," Derek had sobered. "We need Lupe's expertise to interpret what we've found. Her reputation to land another grant. If we get back without her—" His head shook. "We could be accused of inventing the whole story to cover something up."

Ram shrugged. "I see no way to go on."

"Okay," Derek turned back to the bones. "But we've got to take what we can to convince anybody."

"Get at it quick," Ram muttered. "Something else could be collecting our own bones ten thousand years from now."

Watching the oxygen gauges, we got at it. Derek photographed us standing in the trilithons to prove their size. He photographed the red-lit lava-scape around us. He photographed the long pile of skeletons. He made us pose beside that monstrous skull and that huge leg bone.

Ram tried to hurry him.

Scratching in the dust around the human skeletons, we found an odd-shaped stone Ram said was a hand axe, and shards of a pottery vessel that could

have been a water jar. He brushed the dust off the Neanderthal human skull and then an egg-shaped shell about the same size. A pale yellow color, it had two short horns and two empty hollows that could have been eye sockets.

"Nothing human or even kin to human." He turned it in his hands and shook his head. "Silicon, I think. Like what Lupe called an exoskeleton. Maybe from one of the things that built the place?"

He grinned and handed it to me.

"Can you carry it? It ought to start a real debate if we get it out."

He stowed the hand axe and the flint point in his backpack. With nothing else to contain the bones, I dug the jacket out of my backpack and we wrapped what we had collected in that. Derek was still not done. He found a steel tape in his backpack and measured the base of one of the columns. He had me walk straight across the circle and count my paces to get dimensions for his notes. He drew diagrams of the site.

Finally, he wanted photos from outside. We left his collection piled near where we had entered and followed him back along the trail and let him lead us out again, back through the passage where the great tracks vanished. The trilithons stood on a flat stone shelf. We walked out across it to the edge of that dead lava ocean. Derek took several careful shots, and made us stop twice on the way back to pose with the trilithons in the background.

"Let's go!" Ram squinted into the thickening gloom. "It's getting dark."

"It is." Derek nodded at the crimson sky. "I'd guess we have a red giant star for a sun, setting now. I wish we had time to estimate the planet's rate of rotation."

"We don't."

Ram caught his arm to hurry him but froze between the columns, his hand raised to stop us. Ahead of him I saw a thing out of nightmare. Its body was narrow and long, splotted with pale green and orange. Bright metal covered most

of its great head, but I saw a yellow crest, like the saw-toothed crest on that huge skull. Lean lever-like legs held it tall as some ancient saurian. It was following our footprints, its whole body tipping and tipping again to bring its huge red-glowing eyes closer to the floor. It stopped in the middle of the circle.

"Freeze!"

Ram gripped my arm. I thought the thing had seen us, but Ram was pointing at something running down from its body. A strange chain, sliding out of a dark opening, it was made of odd silver-bright objects clinging together. Large and tiny, they were balls and cubes, disks and cylinders, star-shape crystals transparent as glass, and shapeless gray lumps.

It dangled there, twisting back and forth. A thin ray of red light shone from a crystal star at its tip. Searching the dust, it found the trail and followed it toward us. I shivered from a cold certainly that it would find us, but it stopped on Lupe's field hat.

Detaching itself from the monster, it sank down into snake-like coils, glittering in the dust. After a moment it rose again, its bright metal bits flowing into a fantastic parody of something human. Bits bunched themselves into a head, two stars glowing like alien eyes. Forming arms and hands, it bent to pick up Lupe's hat. It came on toward us, and stopped for her sandals. Stalking closer, it found our little pile of relics and formed two more arms to gather them again in my jacket.

Derek raised his camera.

"Don't!" Ram whispered. "Please!"

The thing lumbered back to the monster. The knobby head dissolved itself into a rope that climbed back to the opening in the great body. It anchored itself there, contracted, and pulled itself and its burden out of sight. The opening closed. The monster bent its great legs, sank close to the dust, and sprang. It heard Derek's camera click, but was already high, spreading stubby crimson

ANALOG

wings. It dived straight at us, red eyes blazing.

I stood fixed with dread till Ram caught my arm.

"Hide! Let's hide!"

We darted out of its path and ducked into the next trilithon. Blackness flashed. The ground rocked under me.

5.

Something shoved me. My ears clicked. The ground slid under my feet. I staggered for my balance till Ram caught my arm. Bright sun blinded me. I rubbed my eyes and staggered again. Around us, that black jungle of frozen lavas was gone, but the Sahara dunes had not returned.

We stood on a wide pavement that ran straight into infinite distance. The whole circle of trilithons had vanished. A solid stone wall towered behind us now. I saw no opening at all. Still swaying for my balance, overwhelmed with the shock of too much that made no sense, I was confused, uncertain of anything.

I was giddy, my stomach uneasy. Where was this? How had I got here? Was I sick? Had I had an accident? Groping for anything real, anything I knew, anything sane, I felt a homesick yearning for the easy security of the old brick house back in Portales, where I'd lived with my mother till she died. I longed for her patient smile and her gentle voice when she used to read the plays of Shakespeare to me before I was old enough for school. I needed the comfortable permanence of my father's law library, which she'd kept as he left it as long as she lived.

"Will?" Ram voice was hollow and strange in the smoke hood, but it was real. "Are you okay?"

I felt a wave of gratitude. He and Derek stood beside me, staring down that road that ran forever into hazy distance. They were fellow Horsemen. Reality returned, the radar image, the erg and the old water hole, the megaliths under the sand.

"Hey!" Ram yelled and pointed. "That wall's moving!"

We had stood close to it. It was now a dozen yards away. Ram ran back to it. I saw no doorway, but he snatched the emerald pendant off his neck and tapped it frantically against the spot where we had come out. Nothing opened. He kept trying for half a minute, running to stay there as the pavement flowed under him out of the wall.

Still groping for myself, for something sane, I studied the pavement. Perhaps thirty yards wide, it was striped with the pale colors of a double rainbow, red down the center and fading through all the hues of the spectrum toward dark stripes along the sides. I felt no vibration, heard no sound of anything, but the wall pulled steadily away.

Derek lifted the side of his smoke mask, sniffed, and slipped it off, breathing deep. I took mine off. The air was fresh and cool, with a sweet scent of life. With better vision, I looked around again. The wall behind us was the side of a mountain, cut as smooth as if a giant's knife had sliced the rest away. It rose sheer for many hundred of feet. Rugged mountain slopes above it climbed still higher.

Sliding silently, the pavement swept us steadily into what I felt was the east, through an empty landscape. Tall green grass rippled in a gentle breeze. I saw a flight of birds, black specks wheeling far away, and a white thundercloud building over distant mountains.

"Another world." Derek caught my arm. "Let's wait for Ram."

He had fallen far behind. We ran across the road, staggering for balance as it slowed toward the edge, strip by strip. The motion stopped on the black strip along at the side. We stood there until Ram came down the red center strip to overtake us.

"Crazy world!" He was trembling, breathing heard. "My Little Mama called it hell." He shivered. "Maybe it is."

"With a warm sun shining?" Derek

grinned at him. "Air we can breathe? You want gravy on your bread?"

"Your feel good about it?"

"Fortunate." Derek seemed curiously elated. "We're the luckiest men alive!"

"Lucky?" Ram shook his head at the receding mountain. "I don't see how."

"Let's keep cool and think about it."

Derek sat down on the curb and slipped off his backpack. "Did you ever hear of serendipity?"

Ram looked blank.

"We've just defined it. We came here looking for rocks under the sand and stumbled into what has the look of a high-tech interstellar empire. Think of Cortès when he got to Mexico. Galileo when he saw the moons of Jupiter. I think we're luckier." Soberly, he added, "I hope we can leave a better legacy."

"I don't get it." Ram crouched away from that topless wall. "Where do you think we are?"

"Somewhere off the Earth." Derek paused to scan the green landscape before us. "It has to be, though a lot looks familiar. I've seen grass like this on my uncle's West Texas ranch. But how we got here—" He shook his head. "If we can't turn back, we've got to go on. The story of the trilithons could change the world, if we get back with it."

"And how do you hope to do that?"

"No idea." Derek shrugged. "Let's leave that till later. Right now we've dealt ourselves a royal flush. Let's play it out. If we win the pot, it can outweigh all the gold old Pizarro found in Peru."

"If we play it like a game, what's our next move?"

"Ride the road." Derek shaded his eyes to stare along it into blue-hazed distance. "See where it takes us. Learn what we can. Look for Lupe if we find a clue. Get back home with proof of where we've been. Do the best we can. The pot's too big to lose."

"Lupe?" Ram blinked at him. "Is there a chance?"

"We can hope, and do what we can." Derek opened his backpack. "Let's look

at the cards we hold."

He laid his notebook and camera out on the flat curb of the road. His canteen. A chocolate bar he'd bought when we stopped for fuel at Gabès. Finally the stone hand axe and the Clovis point.

"And there's a sweater, a change of underwear and two pair of socks." He grinned. "I used to be a Scout."

All I could lay out was a bag of dried dates from Gabès.

Ram spread empty hands.

"Never mind." Derek shrugged. "We'll share what we have. Live off the land if we can."

He glanced up at the dark mountain wall, suddenly pointed.

"See those green streaks!"

He went back to study a stone with his pocket lens and found his camera to take a close-up shot. Back with us, he opened his notebook to make an entry in rapid shorthand.

"One puzzle solved." He nodded in satisfaction. "The source of those Saharan megaliths. This mountain has the same fine grain and the same green veins. They must have been quarried here and carried out to Earth."

"If we're really off the Earth—" Ram squinted at him. "Where could we possibly be?"

"The big question." Derek nodded. "But there are things we know. Or things I think we know."

"Tell us what."

"First of all, the trilithons."

Frowning in speculation, he opened the notebook to write again. I saw the words DAY ONE lettered above his neat shorthand.

"I think they are, or were, sort of terminal." He spoke as he wrote, as if dictating the note. "They seem to connect seven planets. An interstellar empire with no space rockets. The terminal world, under that red sun, has to be somewhere out of our solar system. The severe location is a puzzle."

"A death trap!" Ram muttered.

"We got through." He grinned. "If it

was selected to limit access, we passed the test. The skeletons we found didn't come from the builders. Men using stone axes and Clovis points weren't roving space."

He closed the notebook and looked up at us.

"What about the Salisbury Stonehenge?" I asked him. "Is it another gate?"

"A problem for Lupe." He frowned and shook his head. "I heard her mention other megalithic sites scattered across Western Europe. Whoever the builders were and whyever they left, they could have left an influence on our own evolving cultures."

"Lupe's hat!"

Ram pointed across the crawling pavement. I saw her field hat moving down that red central strip. Her sandals came behind it, one by one, and then the skulls and bones we had collected, still wrapped in my nylon jacket. Ram ran out to recover the jacket and brought it back to me. Squatting by the curb, he shivered and watched the hat and sandals and skulls carried on down the road and finally out of sight.

"Could she be still alive?" he whispered.

"Could be," Derek said. "We'll learn what we can and do what we can."

"Learn what we can?" Ram was bitterly mocking. "And never get back to tell anybody?"

"Trust our poker luck! It's running high."

Ram sat for a time in moody silence, and abruptly spoke again. "I can't help thinking of home." He paused to sigh. "Last summer I went back to see my kin in Mombassa and Nairobi. They're in a bad way. Bad government, poverty, sickness. Not much I could do for them, but I met a woman."

I saw the shadow of a smile.

"At the Leakey Museum. We got to talking. She was white, but color didn't bother her. She let me buy her a beer. She was born in South Africa, trained in biology at Cambridge, now employed by

a big pharmaceutical outfit in Switzerland.

"She was there with a tour group, anxious to learn more than the guides could tell her. Her company was testing an AIDS vaccine and she wanted to see more of the need for it. She let me show her around the city and translate for her. We got on well. She left her group and we spent two weeks together."

His smile grew wider.

"Weeks I won't forget. We took a camera safari through the Masai Mara. We climbed Kilimanjaro. We rode a hot air balloon over the Serengeti. Two wonderful weeks, over in a minute." Wryly, he shrugged. "I hated to let her go, but she had to get back to her job and the new vaccine. I had to get home and finish my doctorate. We promised to get together when we could. Maybe try to do something for Africa."

"But now—" The wistful smile evaporated. "I'll never see her again."

"You might." Derek grinned and clapped his shoulder. "Look on the bright side. If we do get back with all I hope we might, we can do great things. For Africa. For all the world." He nodded at the road. "Let's get moving."

"Not so fast." Ram shook his head. "You're a dreamer, but let's get real. The things that built the trilithons and the road may have been great engineers, but I think they're dead. I don't want to meet what killed them. Before we get too far off, I want to look for any way back home."

We looked.

On either side of the road, the sliced-off mountain rose sheer from the grass. We took off the oxygen gear and left the heavy cylinders on the sidewalk, piled against the curb and covered with the smoke hoods. We went north. Ram tramped ahead along the wall, searching for any opening. Derek studied rocks and plants and the whole landscape. We found no break in the slick black stone.

Two or three miles out, we came to the end of the wall, our path blocked by

great piles of fallen scree, with rough boulder slopes above. The grass gave way to thorny thickets, with no hint of any opening. The sun was down behind the mountain before we got back to the road.

I felt hungry and tired, but Ram led us stubbornly across the road to search in the other direction. All we found was that topless barrier of dark, emerald-veined stone, its seamless surface hardly marred by all the ages it must have been exposed.

"Ten thousand years?" Derek narrowed his eyes, speculating. "Or a hundred thousand? I'd like to know."

Night had fallen. We picked our way back to the road by flashlight and tried to sleep on the grass beside it. For me it was a night of misery that seemed to last forever. I shivered with cold and ached in every joint. My shins itched where brush had scratched them. Insects crawled on me and sometimes bit.

I felt ashamed to complain.

Derek lay on his back, happy with by what he saw in the sky. The stars seemed brighter than I remembered, the constellations strange. He found something he thought might be the Pleiades, though smaller and far to the south.

"We're many thousand light-years from Earth." That seemed to elate him. "Farther than any conceivable spacecraft could go."

"Too far." Ram's voice was a croak in the dark. "With no way back."

A strange half moon hung at the zenith, far brighter and three or four times larger than any moon on Earth. Never moving, it grew. By midnight it was an enormous disk, so bright that Derek could find his notebook and set his observations down. It was ice-white at the poles, most of it blue, patched here and there with brown and green, scattered with wisps of hazy white he said were clouds.

"It's no actual moon at all!" He was excited with discovery. "I think we're on a double planet, both members Earth-like.

You see the ice caps. The blue would be water, the green vegetation. That big brown spot could be another Sahara."

"If it's a planet," Ram asked, "why doesn't it move?"

"The rotations of both are locked, like our own moon is. They rotate as a unit, keeping the same faces together. Now at midnight here the sun's shining past us to make it noon on the sister planet. If I'm right, we'll see it eclipsed when the shadow moves across it."

We saw the eclipse. Darkness bit into that enormous disk and slowly swallowed it. As its light grew dim, Derek jotted another note and stowed the little book in his backpack. I shivered and tried to find a fit for my body in the rough ground under me.

"I'm freezing," Ram muttered in the dark. "I wish we'd never seen the damned trilithons."

"The sun will rise and warm us up," Derek promised him. "We're alive, with a royal flush to play. I feel like Marco Polo did, when he got to China."

"Okay. Let's ride the road. It's the only chance we've got."

6.

Ram and Derek stood over me when I woke, their backpacks on.

"Ready for the road?" Derek was calling.

A cup of hot coffee was all I felt ready for, after the long night on that hard bed, but we had no coffee. I slung my pack on and stumbled after them to the wide red strip at the middle of the pavement. It swept us steadily toward the rising sun, into the unknown east.

Derek estimated our rate of motion at twenty or thirty miles an hour. I shivered in the wind of it. The mountain shrank behind us to a thick black stump. The core of a long-extinct volcano, Derek called it. It gave no hint of the trilithons somehow hidden inside it or beyond it.

I stared back at it, wistful for any way back to Eastern, back to my old brown brick on First Street and the library of

English literature I had spent so many years collecting. Ram squatted on the pavement, rubbing at the birthmark on his forehead. Uneasily, he pulled the emerald pendant out of his shirt and squinted at the crown of worlds above that hieroglyphic script.

"Strange!" he muttered. "The mark has been itching ever since we came through." He frowned at Derek. "What could that mean?"

Derek shrugged. "*Quién sabe*, Lupe would say."

He shaded his eyes, scanning the landscape ahead. Tall grass covered the flats. Green trees were clumped on the hills and along the streams. It might have been somewhere in Eastern Kansas before the settlers came with axe and plow.

"Don't let the unexpected you down." He turned to grin at Ram. "Think of Marco Polo on the Silk Road into China, nine hundred years ago. He discovered a vast and ancient empire, unknown to Europe. The Chinese had invented paper, printing, the magnetic compass, gunpowder. He learned a lot and came back rich."

"How long was he gone?"

"Twenty-four years." Derek looked back at the mountain. "But we're somehow moving faster than his ships and horses did."

He raised his camera for a shot of the mountain behind us and turned to get another of a water hole we were passing. Still-legged flamingos were feeding in it, and animals filing in to drink. I recognized warthogs, impalas and zebras. Half a dozen elephants ambled toward it behind a long-tusked bull. A dark-manned lion lay watching from a little hillock. Far off, a giraffe was browsing the top of a tree. Derek opened his notebook and asked Ram to identify a few animals he didn't know: high-shouldered wildebeest, eland, a long-horned Thomson's gazelle.

"That could be Kenya, if I saw Kili-manjaro." He shivered and blinked at

Derek. "Are we crazy?"

"Explorers," Derek said. "With wonders to explore."

Ram turned to stare at a strange tree standing alone on a rocky hill. Its trunk was enormously thick, the branches gnarled and bare, a vulture perching in them.

"A baobab," he muttered. "How did it get here?"

"We're not crazy." Derek took a shot of the tree. "We've simply hit a mother lode of problems, with a grand chance to look for answers."

Ram waved at the water hole and the tree. "If this isn't Earth, what's your answer to those?"

"We're still looking." Derek shrugged and reached for his notebook. "Evolution does create similar forms to fill similar niches, but it doesn't repeat itself. Not so this exactly. Could be—" He shrugged. "Could be they got here from Earth the way we did."

Ram blinked at him. "Brought by men from Earth?"

"Not likely." He shook his head. "Nobody on the early Earth was skipping around the galaxy or building roads like this."

He opened the notebook and made a quick entry. Ram stood frowning at the baobab and the animals around the water hole till they were gone behind it.

"*Angalia!*"

He gasped and pointed. Looking, I found one of those giant hoppers in the sky above the mountain, red wings spread, gliding down toward us. Sunlight flashed on its great silver head. It landed on the pavement a mile behind us, crouched and jumped again. In panic to hide, I started toward curb. Derek raised his camera. On the center strip, they pulled ahead of me.

"Come on," Ram called back. "It has us if it wants us."

I stepped back on the red strip and ran to overtake them. We stood watching. The hopper jumped and jumped

again. Landing a few hundred yards behind us, it sank to the pavement and crouched there watching us.

Derek walked a little toward it to take another shot.

"Don't!" Ram whispered. "Please!"

He took the shot and came back to us.

"We need a record." He grinned at Ram. "It hasn't hurt us yet."

It sat there, never moving. The road swept us on through flat green plains and deep cuts in wooded hills. Overhead the long silver blade of the moon shrank and disappeared.

"Our sister planet." Derek frowned at his watch and nodded in satisfaction. "Lost in the shadow of ours. The crescent should come back reversed."

He watched the sky until it did.

"A useful observation." He scribbled some quick calculation. "The shadow shows that the two planets are nearly the same size. We know from the gravity that they're about the size of Earth. The trilithon builders must have looked a long time to find this system."

Saving food and water, we fasted till sunset. The hopper did better for itself. It soared off the strip, vanished over a wooded ridge, and came back with a full-grown wildebeest kicking in its claws. Back near us, it ripped its prey apart with metal jaws and devoured it, skin, bones, and guts. I heard a deep humming from it, which rose and fell and finally ceased.

"It looks half machine," Derek said. "And acts half alive."

"Alive or not," Ram muttered, "I don't like it watching us."

"We're watching it." Derek dug into his pack for a tiny tube that was both microscope and telescope. He focused it on the creature for half a minute. "Something nature never made." He shook his head. "I want to know what it is, how it got created, and what it did with Lupe."

He studied the creature again, while a thin chain of geometric bits came out of

its underbelly to clean the blood from its bright metal face. Nervous under its fixed stare, we drank a few swallows from what was left in our canteens. Cooler than I was, Derek broke three equal pieces off his chocolate bar. I counted out five dried dates for each of us, but ate with little appetite, my mouth so dry I had to drink again.

Darkness fell. The hopper shuffled closer, but stopped again. Its huge black eyes became red headlamps, fixed on us. In spite of that merciless glare, Derek said we must take turns sleeping, with one man awake to watch. The pavement seemed smoother and warmer than the bare ground had been. I dozed and woke from nightmares of the hopper ripping off our limbs.

Derek stayed awake most of the night, watching sunlight creep across the seas and landmasses of our sister world and longing for the binoculars we had left in our tent in the erg. The great moon grew so bright that the hopper dimmed its headlamps. They blazed again when the shadow of our eclipsed it. Derek looked at his watch and announced that the double planet's day, measured from eclipse to eclipse, was a little less than twenty hours.

The last time I woke, the sun had risen and the hopper was gone. Derek stood with his pocket telescope, scanning the road ahead.

"Something odd." He gave Ram the telescope. "See what you think."

Ram stared. "It looks like the tops of two big black marbles, one of them half buried on each side of the road." He shrugged and gave me the glass. "A crazy world."

It took me a moment to focus the little instrument. The road ran straight toward a mountain ridge ahead. I saw eroded cliffs and steep boulder slopes scattered with pine-like evergreens, but no black marbles.

"Lower," Derek said. "Look at the gap."

I found two brown domes, each

ANALOG

streaked with a narrow black mark from the ground to the top. They were identical and huge, the road a thin line between them. I shook my head and handed back the telescope. He put it in his pocket and reached for his camera.

The objects grew as we glided on, as tall as the hills beyond them. Their sheer dark walls closed in on us, blotting out the morning sun. The road swept us through the gloomy canyon between them. Derek picked up his pack when we were back in sunlight.

"Let's get off. We've got to look."

Ram and I grabbed our packs and followed him off the road to a rocky slope beside it and stood there with him craning up at the dark masses of the domes. They still blocked out half the sky. A rocky bank of detritus had washed down against them from the hills beyond.

"There!" Ram pointed. "Is that some kind of tunnel?"

The wall had the look of long-eroded iron. We climbed to what he had seen, a narrow archway banked high with rubble. I saw no pathway through the weeds and dust that clogged it. The hoppers had seemed half alive and the road still moved, but the domes hit me with a sense of death and desolation.

"Let's get on," Ram said. "I've seen enough."

But Derek clambered over the rocks and through the brush. He stood a moment peering through the archway, found his flashlight, and climbed inside. He was gone so long that Ram finally looked at his watch.

"Give him another thirty minutes. If he doesn't get back, we'll have to go after him."

But he came back at last, bleak-faced and breathing hard.

"It's a fortress." Blinking at the sunlight, he wiped at his dust-grimed face and sat down on a rock to get his breath. "Most of it's underground. I followed a sort of gallery that runs all the way around the dome. There's a dark pit un-

der it, so deep I couldn't see the bottom. I heard water running somewhere below, and far echoes when I yelled.

"There's a weapon in the pit. My light didn't reach to show much, but it's enormous. A cannon or laser gun or more likely something we never heard of. The domes are turrets. They fired though the ports we saw on the other side. The thing was built, I guess, to defend the road or guard the gate we came through. Or maybe to launch missiles at the sister planet? I'd like to know."

"Let's go on," Ram urged again. "I don't like the place. A dead place. Dead too long. Something makes my birthmark burn. Let's get out."

"I know how you feel." Derek hunched his shoulders and sat where he was. "The mystery of it gets me. The builders of the trilithons and the road were high-tech wizards, but their skills didn't save them. I've been wondering how they died. Maybe they got too good with the science of war."

He shrugged and opened his notebook.

Back on the pavement, I felt relieved to be escaping the haunting spell of those dead machines. Derek stood with his camera, shooting the black domes as they fell behind. I saw Ram blinking at them, shaking his head and rubbing at the pale mark on his forehead.

The hills ahead climbed higher. We came into a valley between them. An evergreen forest closed in upon and gave way to a rocky gorge and then a narrow cut with walls so high they hid the sun. Derek was standing with his camera, shooting the strata of white limestone and dark volcanic lavas that lined the walls.

Ram shouted, "Get off! Now!"

We were suddenly back in bright sunlight. The gorge had opened wider. Stony hill slopes rose beside us. The pavement was rushing us toward the lip of a vast abyss. I saw gray haze ahead, and a mountain rim miles away. The road had

reached an end.

7.

We ran for the curb. I lost my balance on the slowing strips and staggered till Ram caught my arm and helped me off the road only a few yards short of that sudden brink. Suddenly weak and gasping for my breath, I was trembling with a shock of acrophobia. High places had always turned me giddy.

In my student years back on Earth, I'd once hiked down Bright Angel Trail to the bottom of the Grand Canyon, taken a swim in the river, and hiked back to the top, all in a single day, but that was long ago. The hazy gulf before us was not so wide, not so deep, but we had come too close. I shrank back and had to look away.

We had come out on a flat shelf of something like concrete. It ran for a quarter mile along the canyon rim. Derek turned to look back. In spite of the break, the pavement still flowed toward us out of rocky hills rose behind it, sparsely grown with tufts of brush and grass. He picked up a rock, tossed it to the red center stripe, and watched until it fell off the broken end. I heard it crash and rattle down the slope below.

"Magic engineering!" He shook his head. "I wish I knew what keeps it moving."

"Magic maybe." Ram shrugged. "But this pit was too wide for it."

He and Derek walked on to survey the canyon. I caught a deep breath and edged to look. It was grand enough. Sheer cliffs dropped from the rim to shelf after shelf, to rubble slope after rubble slope. Streaks of white and rust and brown told the geologic history of the planet.

The river was a thin silver ribbon winding through a narrow black-walled gorge so far below that that it turned me giddy again. Derek walked along the jagged lip, closer than I dared. He leaned over it, and found his pocket telescope to search the slopes below and the

canyon's farther rim.

"I can see the abutments on the far side." His voice was awed. "They're maybe three or four miles away, but it wasn't too wide for whoever built the bridge."

"Or tried to," Ram said. "If it fell before they got it finished."

"I don't think it fell." Derek leaned again to scan the canyon floor. "I think it was pushed."

"Huh?"

"If it had simply fallen, we ought to see a lot of it left on the slopes. Most of it's gone. I do see a few sections, scattered far up and down the canyon. Blown there, I imagine, by an explosion." He frowned and rubbed the stubble on his chin. "I think there was a war. I think that fortress failed to save the bridge."

Ram turned to look back into the gap between hills behind us, the broken pavement still somehow moving toward us. His shoulders hunched as if from a chill.

"So you think the builders killed themselves?" he muttered. "You think this whole world's a graveyard? And we're trapped here to haunt it, with no way home?"

"Trapped?" Derek laughed. "We wouldn't go back, not yet, even if we could."

Ram stared at him.

"If something killed this world, I want to know what it was and why. If we can't go back, we've got to go on."

"How?" Ram gestured bleakly at the pit. "Call the chopper to lift us across?"

"We'll do what we can." Derek shrugged. "Get across the canyon any way we can. Get back to the road on the other side. I want to know what it carried and where it went. We'll go wherever it takes us."

"To hell?" Ram made a sour grimace. "The hell my Little Mama somehow escaped? She never wanted to return."

I saw no way across, but Derek searched along the rim till he found a recent-looking rockslide he said we had to

try. Ram scowled at it doubtfully. The hazy pit below struck me with another wave of terror.

"Here we are," Derek tried to cheer us. "We've got to play the game with the hands we hold."

He'd spent half a summer climbing in the Colorado Rockies, he told us, with a student group. He checked our boots and the straps on our packs and led the way over the rim. I heard him whistling when he had breath to whistle, but the climb down became a nightmare for me.

The rockslide had poured over a bench below, with only emptiness beyond. I shrank back from it, sick and sweating with dread, but I had to follow. We got off the slide and inched along the bench to a sloping ledge that Derek called a natural stair.

An amateur geologist, he talked about the history of the planet when he let us stop to rest. His stair took down along a wall of red sandstone, across a treacherous layer of shale, down again to a shelf of white limestone that he thought had formed on the floor of an ancient sea. He found his pocket lens to look for diatoms.

"Nothing." He put the lens away. "No sign of early life evolving. All the life we've seen looks as if it came from Earth. Another riddle I want to solve."

Halfway down to the river, we found ourselves on a hazardous dead end, with only giddy space below. We had to climb far back and take another way. That took us to a slippery perch on what Derek said had been an ancient lava flow. I clung there while Derek tried a chimney took him nowhere, returned, tried another way and yet another.

We were trapped there till noon. I felt no wind. The sun was blinding, the heat suffocating. I dozed and jerked myself awake in dread of slipping off my narrow seat, dozed again and longed for Eastern and our poker nights, so far away and long ago. I felt grateful for the shadow of the other planet when it

brought back a cooler night at noon.

The sun was soon back, the heat stifling. All afternoon we followed Derek from one dizzy brink to another. We emptied our canteens and ate the last of the dried dates and the chocolate bar. The sun was gone before the final rubble slope took us down to a bamboo thicket on the canyon floor.

We stumbled across a sandbar to the river and dropped on our faces to drink and drink again. The water was brown with silt, but we didn't mind the grit. We lay there, resting, till the chill of dusk drove us to look for shelter in a shallow cave. I slept at last in spite of aching joints and hunger pangs, and woke longing for food.

So did Ram.

"Remember our poker dinners?" He sighed. "Remember Lupe's *chalupas*? Her *huevos rancheros* and *sopapillas con miel*?"

As hungry as we were, Derek had found wild blackberries ripe in the brush on the rubble slope. We picked enough of them to ease the pangs and tried to take stock. The river had been a bright metal thread when we saw it from the rim. Close up, it ran so deep and fast I thought we could never get across.

The canyon floor was nearly flat but littered with enormous boulders fallen from above. The farther wall was black basalt, almost vertical. I saw no possible path to the top, but Derek seemed not to care. He photographed the canyon, above us and below. He updated his notebook. He hiked along the shore to search for traces of the fallen bridge.

"I'm no engineer," he said. "But I want to know what held it up. What knocked it down. The canyon's far too wide for any single span I can imagine, yet there couldn't have been any piers. They'd have been impossibly tall. We saw no sign on top of any towers or cables that could have suspended it."

He scanned the rubble slopes again and shook his head.

Stiff and aching from that that long day on the canyon wall, I limped with him and Ram along the riverbank to search for clues. Ram picked up a scrap of bright metal.

"Stainless steel." Derek examined it and shook his head in disappointment. "But that impossible span was held up by something better."

It had a sharp edge, with one end broken to a point. Ram said it might do when we needed a knife. He put it in his pack, and Derek pushed one to look for something better. We found what he said was an actual section of the fallen pavement. It was enormous, as long as a football field, half buried under great boulders that high water had brought down against it.

Derek frowned and pulled out his pocket lens to study it. The exposed end was massively thick, jaggedly broken off. He found slender threads of silver, glass, and something ruby red, all embedded in a hard black matrix that he could not identify.

"Magic." He shot photos and shook his head. "Pure magic, till we learn enough to understand it."

Ram shook his head at the rushing river and craned to frown at the thin strip of sky above the sheer black basalt wall beyond it.

"First of all, we've got to stay alive."

8.

Ram kept us alive with Stone Age skills learned from his work with Lupe. He cut a stalk of dead bamboo and split the end to hold the Clovis point. He speared a dark-spotted trout, and soon half a dozen. He gathered thistle down, struck sparks with a flint, kindled dry twigs to make a fire. Feasting on broiled fish, I found a shred of Derek's optimism.

Next day we found ripe fruit in a mango tree a few miles up the river. Ram speared more fish and dried them on sticks over a fire. He and Derek gathered

driftwood to make a raft big enough to float our packs and clothing. Swimming with it, we got to a rubble bank on the farther shore.

The rubble had come down a side canyon. Filled with fallen boulders, it looked impossibly narrow and steep, but Ram twisted vines for a rope to hold us together and we climbed for the rim. Thunder boomed before we reached it. The sky grew overcast. A sudden torrent came foaming down to meet us, boulders rolling in it. We had to climb out of the way and wait for it to subside. Dusk was falling before we clambered up the last slope to a stand of tall pines on the rim.

Weak with fatigue, I stumbled away from it and turned to look back. The canyon was already a bottomless chasm of purple night, and a new wave of dread sent me reeling back.

Derek was elated.

"Another hand played," he exulted. "Another pot won. Tomorrow we'll get another deal."

We crept into the pines to be out of the wind and piled fallen needles to make a sort of bed. With no cover over me, I shivered through the night. With the sun up at last, we made a breakfast on mangoes and smoked fish and hiked back toward the road. Slopes were steep along the canyon rim, the forest dense. It took us all morning to reach what was left of the ancient roadway.

Most of it buried under rocks and silt, it no longer moved. Yet still it ran perfectly level as well as perfectly straight. Deep cuts took it through hills and ridges, dikes carried it across depressions. Floodwaters had run through the cuts, leaving only a few shattered scraps washed bare. We had to clamber over landslides that blocked the way, find paths through thickets of brush, climb over boulders and around tall pines.

Smoked without salt, our fish went bad. We had to throw it out. We ate mangoes till they were gone. We tried oak

acorns, roasted in the embers. Ram found a few edible mushrooms, but nothing gave us strength. An icy rain left us miserable. We came to mountain wall, with forbidding cliffs ahead.

"The end of the road." Ram made a wry face. "We've found Little Mama's hell."

I felt ready to quit, but Derek discovered a tunnel mouth behind a screen of trees. Inside, we found dry driftwood. Ram was able to kindle a fire. Grateful for shelter, we dried ourselves and slept beside it. Next morning I chewed a scrap of cold charcoal from our dead fire, which had a sweetish taste. With only our flashlights to show the way, we blundered down the tunnel, through pools of standing water, finally back into bright sunlight. Ram was tramping ahead, as if he saw a way back to Portales.

"People!" I heard him shout. "Live people!"

Looking past him, I saw a friendly landscape of small green fields and wide pastures with neat hedgerows or low stone walls between them. A row of windmills swung their vanes on a distant ridge. Closer to us, white-painted cottages scattered gently rolling hills. A spotted cow and yearling calf grazed the nearest pasture. A live man in the field beside it was riding a silent plow that cut a straight brown furrow through green turf.

I saw no more of the road.

"Peaches!" Ram shouted again. "Ripe peaches."

We ran down the slope into an orchard of ripening fruit. Bright red cherries tempted us from the trees, apples still green, golden peaches with their delicate fur. I could almost smell their aroma, taste their juicy sweetness. Ram tried to pick one and recoiled in dismay.

"Crazy!" His voice shook. "Am I crazy?"

I reached for a peach. My hand went through it. I tried again. The tree wasn't there. Ram walked into it, vanished, and

appeared again on the other side.

"Are we dead?" He was hoarse and shuddering. "Really trapped in hell?"

"Listen." Derek held up his hand. "What do you hear?"

We listened. Birds were whirling around the cherries, but they made no cries. Leaves were trembling, but I heard no rustle of the wind. A dog in the road beyond was jerking its head at a bristling cat, but I heard no barking.

"Dead men don't get this hungry." He grinned at Ram. "More likely, I think we've blundered into some kind of super-computer simulation. A virtual world. One more relic of the technology that built the trilithons and that bridge."

Ram asked, "What for?"

"Likely education." Derek cupped his hand to his ear and shook his head again. "But now without sound effects."

Beyond the orchard, a stone-curbed gravel path led toward a red-tiled cottage and a tall wooden barn. We walked through the walls into barn. It was neatly kept, with hay in the loft and farm implements arrayed along one wall. A brown sow lay on her side, a dozen piglets scrambling to reach her teats. White hens ran free. I saw a rooster strut and crow, but still I heard no sound of anything, caught no scent of manure or molding hay.

"Nothing real," Ram muttered. "We're all in the same crazy dream."

"Or a dream of ideal perfection." Derek nodded at the windmills on the ridge and a yellow-painted tank behind the barn. "It looks very simple, but it's all high-tech. Everything kind to the environment. Power from the wind. A digester to generate methane gas from the waste."

"A devil's dream!" Ram's shoulders hunched against a wind I couldn't feel. "No wonder Little Mama ran away."

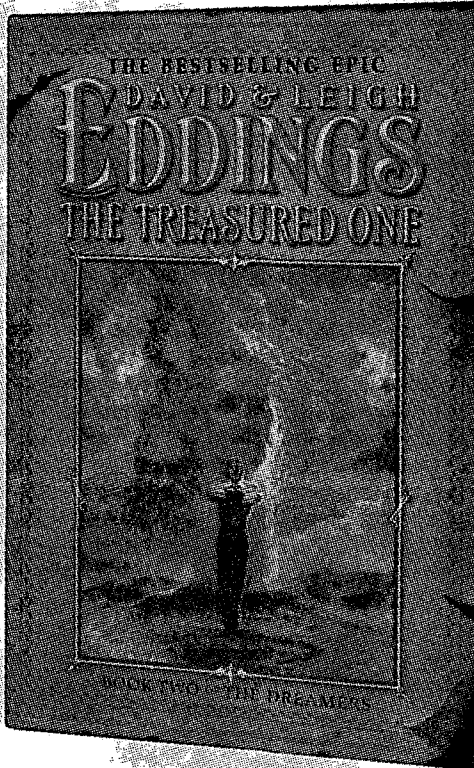
We went on to the cottage beyond it. A big German shepherd lay asleep on the doormat. It did not wake, not even when Ram stepped over it. He pushed at the doorbell. His hand went into the

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wall. I followed him though the solid-seeming door. In the kitchen, we came on a scene that recalled my childhood in that old brown brick back in Portales.

A freckled boy in a blue school uniform sat at the table frowning over a wooden puzzle, a bowl of uneaten cereal in front of him. A slender girl, a little older, was tying a red ribbon in her blonde ponytail. I thought she was beautiful, too fresh and lovely to be any kind of computer simulation.

The white-aproned mother, with her golden-tan skin and straight dark hair, might have been a younger Lupe. She was filling two lunch boxes, one blue and one green. My own mouth watering, I could almost taste the food she was packing: two hardboiled eggs, two fried chicken drumsticks, two brown biscuits, two red apples.

The mother set the boxes on the table, scolding silently. The boy thrust the puzzle into his pocket and wolfed the cereal down. The girl undid the ribbon and tied it again. The mother kissed them both, and gave them some soundless injunction. We followed them to school.

The silent dog went with us. The school was a neat single-story brick with a green lawn in front and a paved playground behind. The children ran ahead to join friends on the playground. We walked through the front door, into a silent hall crowded with happy-seeming students and smiling teachers.

Two huge globes floated in the air over their heads.

"The double planet." Derek stopped to study them. "They must have had lessons on the dynamics of it when they were still alive. I wish I could listen in."

The globes were rotating slowly, with nothing visible to move them or hold them off the floor. They looked Earth-like, with more blue ocean than land. Neither had an ice cap. I saw a tracery of colored lines that must have been roads, dots and circles for towns and cities, letter-like symbols that baffled me.

"Writing!" Ram pointed. "It looks like that script on Ram's key." He sighed. "If we could read it."

Derek waited to study one of them as it swung close to our heads, and looked up at the other.

"That's odd!" He pointed to a bright silver thread between them. "A skywire?"

"What's that?"

"A cable way between the planets. That's possible. They're locked in rotation, always facing each other. It takes a strong material, but back on Earth we already have carbon nanotubes a hundred times as strong as steel."

"If they were all that smart—" Ram squinted at the globes and shook his head. "How come they couldn't save themselves?"

"That's the question." Derek shrugged. "We're looking for the answer."

The more urgent question for Ram and me was how to find something to eat. In a world of nothing we could touch, nothing we could taste, we followed Derek through worktables and wallboards and busy kids that might have been in schools back in Portales. Nobody saw us.

We went on to a village that almost might have been Middle America, except for the hieroglyphic street signs. In an open square at the center of it, farmers were offering ripe fruit and fresh vegetables. The smoke of meat grilling on a charcoal brazier looked so real that I had to turn away. Derek took a photo and Ram hurried us on.

We left the village on a highway paved with gray concrete never meant to move, busy with trucks and odd-looking passenger vehicles that never veered to avoid us. It took us into a fair-sized city, the streets of it crowded with people who never saw us. Shop windows showed fashions strange to me. Our can- teens were dry, but the loaves and cakes in a bakeshop wet my mouth with saliva.

"Look at that!"

Ram stopped us to point at an open square. A circle of tall megaliths surrounded a taller trilithon at the center. Banks of seats rose on either side, ready for the spectators to some event on a raised stage between the columns.

"Could it be?" he whispered. "A way out?"

We followed him to the stage, walked through the trilithon together, found ourselves still in the same soundless shadow city. His hand went into the solid-looking stone when he pressed the emerald pendant against it.

"If all this is just a simulation—" He shook his head at Derek. "Why would they do it? What was it for?"

"Maybe entertainment." Derek frowned at the stage. "Maybe social engineering meant to stop the tides of war. Some kind of ideal utopia broadcast to show people what they ought to be instead of what they were."

"Which fell flat," Ram muttered. "The way the bridge did. And all long before the Egyptians built the pyramids." He shrank back from the trilithon. "We're caught in a ghost world, with no way out."

"Or perhaps there is a way." Thinking, Derek scratched at the new stubble on his jaw. "That pavement has run straight, across all sorts of country. Maybe it went on. If we had a compass—"

"We don't need a compass." Ram nodded down the street. "I was born with a sense of direction. I never got lost, not back on Earth." He pointed. "If the road ran on, it went that way."

We followed the street until it became a highway that took us out of the city and thorough scattered country places, on beyond them across grassy prairie where sheep and cattle grazed. I saw rugged mountain slopes ahead and wondered if the road had really climbed them.

The sun grew hot. My tongue felt swollen, and my mouth had a taste of bitter dust. Hunger gnawed. I felt weak and sometimes stumbled over something I

never saw. Sometimes the simulation itself shimmered into unreality. Plodding after Ram, I fixed my eyes on the flint point of his bamboo spear and tried to think of nothing else. I felt glad when noon came, and the cooler shadow of the eclipse. Carefully, Derek noted the time in his book. I wondered at his sanity, here in the midst of madness.

The sun returned, soon hidden by a dark cloud that rose in the west and rolled overhead. Lightning flashed around us, but we heard no thunder. Sudden raindrops struck us, but I felt no chill. Silent hailstones bounced around my feet. The rain ceased, but it had failed to cool the air.

The sun came back, suddenly hot. Thirst was bitter dust in my throat, hunger an ache in my belly. Reeling with fatigue, I tripped over something on the road that I hadn't seen. I got my balance back, but Ram staggered forward and yelled an alarm in his native Swahili.

"*Angalia*. Look out!"

Falling face down on what looked like solid pavement, he disappeared through it. Derek and I were left standing alone.

9.

Stunned and giddy, I staggered again. My stomach heaved. That untouchable world whirled around me. My faith in my own senses was gone.

"Ram?" My voice was a rusty croak, but I called again. "Ram?"

There was no answer. His spear lay near where he had vanished. The pavement around us was empty. Lightning still flickered in the storm cloud that had passed us, but I heard no thunder.

"What happened?" Still giddily swaying for my balance, I blinked at Derek. "Where is he?"

Calmer than I, he peered around us, shook his head, and picked up the spear.

"A virtual world." He began stabbing at the pavement. "Cleverly done. I'd been wondering about the solid ground under us. Nothing else is real, but we haven't fallen through."

He frowned at the hills ahead. I thought something had hazed them.

"You know what?" He nodded at me. "I think we're coming to the end of the simulation. I think Ram walked onto ground that wasn't there."

He prodded at the pavement where Ram had fallen. The spear went through it. He stepped cautiously forward and his feet disappeared. Probing with the spear, he led our way down a rocky slope we couldn't see. I followed him gingerly.

The sunlit pavement rose around me as if I were wading into water. He was ahead. I saw the pavement reach his waist, his shoulders, his ears. He was gone. A stab of panic stopped me. Trembling, a cold knot in my stomach, I looked back through the sunlight to another lighting flash in the thundercloud.

"Will?" Derek's voice came from nowhere. "Let's get on."

I caught a deep breath and took another step. That sunlit world was gone, the sky darkly overcast. I saw a stretch of shattered pavement behind us, littered with broken rock. All around us lay lifeless ruin: crumbled walls, stumps of dead trees, wrecked tanks and cannon, broken stone, deep crater pits. We had walked off the end of the pavement, into the edge of a chasm many yards across.

Ram sat on the slope below us, rubbing at a bruise on his shoulder.

"Hello." He grinned at us. "I was afraid you'd never show up." The grin gone, he frowned at Derek. "If this isn't Little Mama's hell, I think it's close enough to do."

Down at the bottom of the pit, I saw a tank-like war machine, black with rust and rolled on its side, one caterpillar track ripped off. A long gun jutted out of it. A jagged hole yawned where the turret had been. Bones and skulls of men lay scattered about it, rusted helmets, wrinkled boots, fallen weapons half hidden in the mud. Derek climbed down to inspect it, picked up a wicked blade of some bright metal, and clambered back

to us.

"Well?" Ram grimaced at him. "What do you think?"

He turned to shoot another photo and stood a moment rubbing thoughtfully at his jaw. "This was an interstellar civilization, on half a dozen planets scattered so far apart that their death is hard to understand. Warfare seems to have killed them.

"The trilithons must have been bottle necks for armies and military hardware, but here's a theory. The people here knew about their danger in time to build the fortress we saw. They lost the war but some of them survived long enough to attempt a recovery."

He gestured at the tank and the bones around it.

"This could be some kind of memorial, built to hide a battlefield. A virtual display of the peaceful culture they remembered and hoped to rebuild. What you might call anti-war agitprop. All of it virtual."

"Could be." Ram shrugged and winced as if it hurt. "What I want is something real. Something like a rare sirloin with eggs over easy at the Roosevelt on Second Street. Remember?"

Virtual or real, the war-torn landscape looked the same to be in all directions. Hopelessly lost, I wondered if we would ever eat again, but Ram got back to his feet. With the bamboo spear for a cane, he limped ahead again, leading us around shell pits and on toward a wooded ridge with higher hills beyond. We came to a scrap of the ancient pavement. A sign on a post at the middle of it had hieroglyphs that must have read something like DEAD END.

However, it was not quite the end. We climbed over a rock pile beyond the sign and into another tunnel, paved with colored stripes like the road we had ridden from the trilithons. I saw no movement, but the walls were tiled with something that still shone with a soft gray glow.

Ram insisted that he wasn't really hurt, but we lay down on the pavement and tried to sleep. Taking my turn on watch, a few hours later, I saw that the wall was slowly sliding back around us. Derek woke, walked to keep with the wall, and estimated our speed at two miles an hour. He made a note in his little book and smiled into the light ahead.

"I wonder what comes next."

"I don't much care," Ram grumbled. "It won't be Earth."

The road accelerated. I was on watch near midnight when it brought us out of the tunnel into the cold gray glare of that enormous moon. Full, it lit a dead landscape of high sand dunes and wind-carved rocks. Moving faster now, the pavement ran straight on across it into what Ram said was the east.

Miserable with thirst and hunger, I was still awake, lying flat on my back when the sun came up. I heard Ram's excited shout and sat up to see him jump off the road. I shook Derek to rouse him. We grabbed our packs and followed. He stood staring at a strange monument that towered out of the dunes.

"The rulers?" He stopped to take a photo. "Or maybe the gods?"

Two colossal human figures, male and female, sat facing the road on a throne the color of gold. They were nude, the male jet-black. Ram might have been the model for it. The likeness seemed uncanny, even to the white birthmark on the black's forehead. The full-breasted female was marble-white except for her own birthmark, a black crown of worlds.

"Your own great something grandparents," Derek grinned at Ram. "If that mark's really hereditary. You may be a prince, destined for a throne of your own."

"A prince of hell?" Ram scowled at him. "I wish you'd never seen those rocks under the Sahara."

"Don't say that. We could be the luckiest men that ever lived."

Ram shrugged, with a dismal face.

"Look where we are," Derek nodded at the pavement. "On our own Silk Road. Old Marco Polo had a golden tablet stamped with a passport from Kublai Khan, but he had only East Asia to explore. We have your magic mark and your emerald key, with unknown planets ahead."

"And all of them dead?"

"No matter," Derek shrugged. "Marco got back to write a book. With luck enough, we'll get back to do our own."

"Not likely," Ram scowled at the black colossus. "We've come too far from Earth, with no way back."

"Your Little Mama found a way," Derek grinned and clapped his shoulder. "She came from somewhere people were alive. And didn't she say that the road to heaven runs through hell?"

"So she did," Ram shrugged and squinted at the dance of heat on the desert horizon. "And you can call this hell."

I felt almost too giddy and faint to care, but Ram shouldered his spear and led us on. The sun was larger and hotter I thought than the sun of Earth, but the daily eclipse brought a welcome shower. The sun came back to glisten on rain pools. We lay face down to suck mud-colored water out of the puddles. It was sweeter than wine, and we managed to fill our canteens.

Before sunset we were passing a water hole with a little herd of impalas grazing toward it. They raised their heads to look at us and ran in sudden panic from a cheetah darting from a clump of brush. Most of them were fast enough, but it overtook a laggard calf.

"There's our dinner!"

Ram jumped off the road. We followed. The cheetah was lugging its kill toward the brush. Ram yelled and waved his spear. It dropped the calf and bared its fangs. He advanced on it. Derek and I yelled and looked for stones. It stood snarling till Derek threw a rock that hit it

ANALOG

in the head. It finally left the calf and slunk back into the brush.

We carried our prize back toward the road. Derek had hunted deer with his dad when he was a kid, and he knew how to dress the carcass. I looked for dry wood. Ram kindled a fire. We held chunks of meat on sticks to broil them, and devoured them rare. They were wonderful.

We slept there that night, with one man up to keep the fire going and guard our kill. Next morning we had a splendid breakfast before we went, carrying a hindquarter of the calf wrapped in its hide. Flowing on as if it had never been broken, the road carried us on through into scrub vegetation and finally into more fertile grassland.

After the eclipse on the third day we saw low brown hills ahead, and a row of tall megaliths standing in a gap between them. Derek studied them with his pocket telescope.

"Trilithons," he said. "They look like the terminal group that put us on the road, but I see another canyon in the way."

Another vast pit opened ahead, but it was not a canyon. The pavement took us around the rim. It was enormous, five miles across, Derek guessed, and perhaps a mile deep. A spiral road wound down the walls of it, to a blue lake at the bottom that shone like a mirror.

"An open-pit mine." He searched it with the telescope. "Abandoned."

He passed the little instrument to Ram and then to me. I saw huge machines along the spiral, metal-jawed excavators, tall cranes, heavy vehicles piled with ore. Nothing moved.

Ram frowned at Derek. "What were they mining?"

"I'd like to know." Derek shrugged. "Metals, I guess. It took a lot of something to build all they did."

Ram grunted, and we let the road take us on. The megaliths ahead towered high and higher ahead, great stone pillars capped with massive lintels.

"One more terminal." Derek took back the telescope to study them again. "Busy in its day. I count thirteen trilithons."

The road slowed and stopped. It left us standing between two immense square columns of some dead-black stone. The lintel, forty feet above, framed it like a gate. The vast flat floor inside the circle shone white as new snow. Derek pointed across it.

"We saw the skywire," he whispered. "Here's the terminal!"

In the center of the circle I saw a thick disk-shape of some silver-bright metal. As large as a railway car, it had windows spaced around it and an oval doorway facing us. A bright cable that looked as thick as my arm rose from the top of it as far as I could see. Derek found his pocket telescope to follow it toward the zenith.

"Shall we take a skyride?" Derek grinned at Ram. "Up to your Little Mama heaven?"

"Heaven?" Ram reached for the telescope and took a long time following the cable toward the long thin blade of the sister planet. He shook his head and I thought I saw him shudder. "Will it be heaven? Or a deeper circle of hell?"

Yet he shouldered his spear and we walked together toward the foot of the cable.

10.

The thirteen tall black trilithons towered like prison walls around us. Or more like the pillars of some strange temple, I thought, with a skycar an altar at the center and the skywire ladder to the other world above. Awe of it chilled me. Ahead of me, Ram stopped and looked back at Derek.

"What if it's another traffic control? Another killer planet? Our smoke hoods are a long way behind."

"A chance we have to take." Derek shrugged. "A run of luck we have to trust."

"And no other choice."

Ram shrugged and led us on.

The skycar had seemed toy-like, seen against those immense black pillars, but it grew as we neared it. A low wall of some white stone surrounded it, with a miniature trilithon framing a gateway. Derek fumbled for his camera and suddenly froze, staring ahead.

Something lay in the gate. A pile of tiny cubes and disks and cylinders that shone like new silver, mixed with bits of glittering crystal and little black lumps. They stirred as we came near, clumping into a snake-like shape. The head of it rose and changed into a grotesque travesty of a human head, with two gleaming crystal disks for eyes.

"What the hell?" Ram raised his spear. "If this is hell?" He blinked and shook his head at Derek. "If it's the sort of demon my Little Mama—"

He stopped when it spoke to him in a brittle, short-clipped voice. A greeting? A question? A command? Its tone told me nothing. It moved again, the knobby head rising higher, arms sprouting from the body, the base of it dividing into legs and feet.

Walking like a man, it stalked to block our way. Ram flinched from it.

"Your Little Mama's magic key," Derek called to him. "It could be the ticket."

Ram fumbled under his shirt for the little emerald pendant and thrust it toward the monster. The crystal eyes flickered red. It barked at us. The strange head bent in a sort of bow. One gleaming arm waved us toward an oval door sliding open in the side of the skycar. A twin thing appeared there, turned those gleaming disks upon us, and beckoned us to enter.

Ram flinched from.

"It's a robot," Derek told him. "I guess the flight attendant."

"A robot?" Ram clutched his spear. "It looks like a devil's dream."

"I think it's a cellular robot," Derek said. "I saw an experiment at MIT. The units are relatively simple but designed to work together. Complementing one another, they make a whole greater than

its parts. Let's go aboard."

Ram shrugged and held the spear like a cane. We walked past the robot into a ring-shaped room with rows of seats facing the windows. The doorway shrank and closed. A gone pealed. I heard no sound of any mechanism, but the dark circle of trilithons fell away. We dropped into the sky.

A wave of nausea hit me.

The window was too large and too near. The floor under us was glass, or something like glass. Rising in front of us and curving overhead, it filled me with a dread of falling off my narrow perch into a deepening abyss. Chilled with a sudden sweat, I had to shut my eyes.

Gripping the arms of the seat, I tried to think of the adventures of Marco Polo or the syllabus for my seminar on Shakespeare's history plays. Anything except that awful gulf. Ram asked if I was sick. I could only swallow hard and shake my head.

We were already high before I dared to open my eyes, so high that my panic fright was gone, though it had left me shaken and ashamed. Ram was sweeping the world below with the little telescope, Derek aiming his camera at the mine pit, which had shrunk to a little dimple.

"The cable took a lot of metal if it's any kind of metal," he was saying. I imagine most of it came from there."

The trilithons were already too small to see, the floor under them a tiny a small white dot. I thought I could trace the road, a thin dark line running straight toward the misty horizon in what must be the west. I found clouds, bright little puffs of cotton, already far below. The sky had darkened, fading into purple.

"*Chakula!*" Ram sniffed and came to his feet. "Food!"

I caught a scent like the fragrance of baking bread. We followed him into an inner room. Tables and chairs were spaced around a thick cylinder that I thought must be a shield for the cable.

ANALOG

We sat at a table. The robot attendant came to stand over us, speaking again in that quick sharp voice.

"It wants our orders." Derek pointed at hieroglyphs on the tabletop. "The menu, maybe?"

He set his forefinger on a line of script. The robot clucked and fixed those crystal eyes on Ram. He made a stab at the symbols. So did I. The robot glided away. It came back with a glass of water for him, a slice of a ripe papaya for Ram, a cup of very good coffee for me. We tried and tried again. It brought me a bowl of something so bitter I spit it out, and then a basket of some strange green fruit, but we kept on till Ram hit the code for a platter of steak and scrambled eggs.

"Synthetics, I guess." Derek shrugged and speared another slice of meat. "Not that I care."

We ate half a dozen platters clean.

When Derek got up to look for a bathroom, the robot did more than show him the way. He came back looking like another man, his weeks of stubble shaved, his sandy hair neatly cut, wearing a trim jacket of something like silk with intersecting circles woven into the breast. Derek and I followed him.

The sunward windows had been darkened when we returned to our seats. I felt that we were floating in a gulf of darkness, above and below and all around us, until my eyes adjusted and stars blazed out. The same constellations we had seen every night on the moving road, but turned strange with a million more stars, a universe of diamond points more splendid than I had never imagined.

I don't know how many hours we spent in space. Even Derek was too busy to watch the time. He swept the stars with his tiny telescope and longed for a lens with greater power. He scanned the powdered fire of the Milky Way, trying to guess where we were in the galaxy. When Ram wanted to know the direc-

tion of Earth, he could only shake his head.

A gong sounded. The attendant came to stand beside us. Seat restraints folded around us. Suddenly we were falling. The starry cosmos tipped and swung around us. I felt a moment of vertigo and clutched at my seat until our weight came slowly back. I caught my breath, swallowed hard, and felt secure again.

"Midpoint," Derek said. "We're falling now, toward our destination."

Still famished from our long hunger march, we returned to the inside room and devoured another banquet. When I dozed, the attendant came silently to recline my seat and spread a blanket over me. Ram and Derek woke me with their excited voices.

"Pangaea!" We were coming down to the sister planet. Its globe was already vast, half ocean blue, half shaded with greens and browns and grays. Derek was scanning it with his little telescope. "Earth might have looked like that a billion years ago."

He gave Ram the telescope while he shot a photo and took it back to study our destination.

"A city," he said, "with green parks around it. No bomb craters or signs of devastation I can make out. All we've seen is death, but perhaps it escaped the war."

"My Little Mama came from off the Earth, or said she did." Frowning, Ram touched an absent finger to the crown of worlds on his forehead. "My father never believed her, but we've seen a lot that fits what I heard her say when she was down with the fever. She must have left people alive."

"A riddle if she didn't." Thoughtfully, Derek fingered his freshly shaven jaw. "We saw what happened to the canyon bridge. We saw the wrecked war machines under the simulation. Wherever she came from, it wasn't from there."

The other planet, now overhead, had dwindled to a narrow sickle, still so

bright it dimmed the stars around it. Derek tipped his camera for a final shot and took the telescope to scan the city again.

"It lies along an ocean coast," he said, "between the shore and a wooded mountain range. Maybe twenty miles of it stretched along the coast, but only three or four between the beach and the hills. A lot of trees along the streets, and nothing like a shantytown. It looks alive. The climate should be fine. A pleasant place to live."

Ram took the telescope to sweep it again.

"I don't know." He made an uneasy grimace. "It looks too empty. No vehicles moving on the streets. No ships off the beach. I'm afraid it's dead."

The black sky turned purple and finally blue. A white dot at the bottom of the cable stretched wider. Slowing, the sky-car gave us time to survey the city. Three wide avenues ran the length of it, parallel to the sea. Cross streets ran down to a wide white beach that looked like coral sand.

In the hills to the west, I saw a dam in a canyon, with a long blue lake behind it and snow-crowned mountain peaks in the distance. The top of a tall black butte behind the city had been carved into two colossal nude figures, a man and a woman, seated on a throne.

"You should have connections here." With an ironic glance at the crown of worlds, Derek handed Ram the telescope. "If this is your Little Mama's heaven, you may have people here. You may have been marked for some noble destiny."

"Destiny!" Ram snorted. "All I want is to get back home."

I leaned to look down the cable. A white dot at its foot was swelling. The city streets rushed away. I was falling with nothing under me. Nausea shook me, and a sudden sweat chilled me. I gripped the arms of the seat and shut my eyes till I heard Derek's voice and

knew we were down.

"Seven gates!" He spoke to Ram. "Gates to the seven worlds in your crown."

I swallowed hard and caught a long breath. We were safely down on the safely solid pad. A black shadow fell across us, cast by the immense square columns that hid the sun. The great circle inside the trilithons was empty now. I saw no motion anywhere.

The door of the sky-car slid open. The robot stood beside it, silently bowing. We picked up our packs and shuffled out. Three little piles of bright metal crystal lay before us on the floor. Lazily, they stirred as we stepped down. They formed three thick coils that lifted and morphed.

In a moment they were three caricatures. A fantastic mockery of Ram, a tiny white crystal flashing on his forehead. Derek, with a two-fingered hand holding something like his telescope, craning to scan the cable. A smaller figure, stooped under a bulging backpack, that had to be me.

They bowed, quacked at us, and stood motionless.

"Waiting for orders," Derek said. "If we knew the language."

We didn't.

After half a minute, they bowed again and sank back into three glittering serpents. A hole yawned open in the floor beyond them. They crawled into it, and it shut behind them. We were left standing there on the vacant floor at the foot of the cable, the tall black trilithons towering around us.

I felt terribly alone.

11.

The sky-car left us alone at the cable foot. We watched it climb, shrink to an insect, disappear. A seagull soared past the cable, but I heard no human sound, saw no human movement.

"If this is anybody's heaven," Ram muttered, "not many got here."

"Empty or not, it's something new to

ANALOG

see." Derek frowned at his birthmark. "Your Little Mama came from somewhere. She must have left people alive. We've a chance to find them here."

"If we knew which way to go." Ram shrugged uneasily. "Or what we'll meet on the way."

We stood uncertainly peering around us. The great black trilithons stood far apart. Though the gaps between them I saw wide avenues walled with a magnificent architecture. Stately buildings several stories high, most of them stone. Slender minarets, a golden dome, a towering white obelisk, a magnificent arch.

I looked up the cable after the skycar, already wistful for the meals and the bath, wondering if we should have stayed aboard. Derek hitched his backpack higher and nodded toward the morning sun.

"The ocean's that way. Let's see the city."

We walked around the trilithon to the broad avenue. Derek stopped to shake his head at the pavement. Color-striped like the road we had ridden, it was flowing in two directions, with a stationary strip between. We stopped at the curb, looking up and down it. As far as we could see, nobody was on it.

I tried to picture the city as it must have been, people riding the pavement, bustling about their business, living in the houses. But who had they been? What had they worn? What had they cared for or feared, worshiped or believed? What had they done for a living? I had to give the effort up. This world was too strange.

Ram had turned uneasily to Derek.

"The people? Were they human?"

"They must have been." Derek frowned and nodded. "Those we saw in the virtual world looked as human as we are. The skulls on the battlefield were human. Your Little Mama's people were human, or you wouldn't be here."

"I don't get it." Ram blinked at the empty avenue. "Machines are still running. I don't see any damage from the

war. What became of the people?"

"One more riddle." Derek shrugged. "With luck we'll get the answers."

Ram shrugged, gripped his spear, and led us on.

We got on the moving pavement. Two blocks down, it divided to flow around an island that held a colossal monument. Nude figures of a black man and a white woman sat side by side on a golden throne, holding hands and smiling at each other. Both foreheads wore the crown of worlds.

"That's you!" Derek gave Ram a quizzical grin. "You've come home."

Ran shook his head, and something pinched his face.

Farther on, we stepped off the pavement to stare at a white marble temple. It was another Acropolis, on a somewhat larger scale, the white columns perfect, the architrave and roof intact.

"Are we crazy?" Ram shook his head at Derek. "Did the old empire reach to Greece?"

Derek found his pocket telescope to scan it.

"Lupe thought we might be kin," he said. "The bones she found at the old waterhole are evidence of that. As she said, the Salisbury Stonehenge could go to show a cultural influence from somewhere off the Earth. She'd be crazy to research a monograph about the interstellar culture, if we hadn't lost her."

He studied the temple again.

"The architrave shows no Greek mythology. These images could tell a very different story, if we knew how to read it. There's your holy family at the center, with your crown of worlds above them." He grinned at Ram and pointed. "That's a rocket ship in flight. We've seen no rockets, but the invention of the gates would have made them obsolete."

He frowned again at the architrave.

"They had a great civilization. They commanded amazing technologies. They were exploring space, planting life on dead planets, building magnificent cities, till something went terribly wrong. Now

they're gone without a trace, as if some Pied Piper had carried them away. I'd like to know where—

"But look at that!"

I saw a figure on the pavement avenue, gliding toward us fast. Another cellular robot, when it was close enough to let me see. It stood by a cart loaded with broken tree branches and scraps of junk, a dead seagull on top of the pile.

"Maybe that's why we find no skeletons, no trace of the people. The robots haven't forgotten their duty. They keep the city clean. If some pandemic killed it, they would have removed the cadavers."

We wandered on into what must have been a business center. There were no skyscrapers, but the massive facades rose several stories tall. They looked oddly half familiar. Polished granite, shining metal, spotless glass, they might almost have stood in New York or Hong Kong.

Wide show windows fascinated us. Handsome brown-skinned models were nude enough to appear convincingly human. They offered gems that looked precious, garments in styles that might merely have looked exotic at home, but most of the displays were nests of riddles.

Ram tried the doors, but they were locked. He tried his emerald pendant. Nothing opened. Derek shot photos and we walked on to a black-pillared trilithon that loomed above the roofs ahead.

It towered at the center of a wide green park, the grass around it neatly mowed. A moving pathway carried us toward banks of seats that rose on either side of it. The seats were empty, the floor around the pillars bare. I saw no movement till Ram pointed at a line of huge green hieroglyphs crawling across the great black lintel stone.

"What do you think?" He looked at Derek. "Was it another gate? Some kind of theatre?"

"Or a temple?" Derek shrugged and

grinned. "They did gather here. Could be to worship your ancestral gods."

Ram winced from his ironic tone but said nothing.

"Tired?" Derek looked at me. "Let's sit down and decide what to do."

Tired of walking, tired of too many enigmas with no answers, I felt grateful for a chance to rest. We went on to front row seats facing the vacant floor between the vast black columns. The moment we sat, the silence was broken. Strange chords pealed from nowhere, and slowly died away. The columns and the seats beyond them flickered and vanished. We sat at the brink of a black and empty void, so close to us that my stomach heaved.

Giddy, I caught Ram's arm. He was frozen, watching bright golden hieroglyphs swimming through the darkness. They faded. Stars came out, but not the alien stars we had seen from the skycar.

"Orion!" I heard Derek gasp. "There's Rigel, Betelgeuse, Bellatrix. It's taking us home, back to our own galactic neighborhood."

The stars swam apart to leave a single faint fleck alone in the void. It grew brighter, brighter, brighter, until it was nearly blinding. It drifted away, leaving a dim white point where it had been. That swelled into a bright blue globe, patched with spiral storms.

It was suddenly Earth, so near it knotted my stomach with a sense that we were falling toward it. I saw the blue Mediterranean, the shape of North Africa, more green than brown. We came down beside the twin pillars of a lone trilithon. This should have been the Sahara and the Great Erg, but I saw no sand.

Beyond the columns, instead, lay a landscape of grassy meadow and unfamiliar trees. Warthogs stood in a water hole near us. Impalas and zebras grazed toward it. Two tall cellular robots came lumbering from it toward us, carrying something in a cage.

They vanished before I could see

what was in the cage. Strange music rose and fell. Strange voices quacked and trilled. Glowing hieroglyphs raced through a dim blue haze that faded into blackness. When sunlight returned the pillars still stood and sand had piled high around them and the lintel stone had fallen.

I found our little tent in the hollow in the dune where the water hole had been. Lupe Vargas, in her wide-brimmed field hat, was on her knees in the dig, cataloging her collection of bones. His trousers down, Ram squatted, Ram beyond the ridge.

"Angalia!"

Sitting on the seat beside me, he yelled and pointed. The sand around those buried columns was exploding. That gigantic hopper burst out of it and stood up on its long metal legs to look across the dunes. A strange thing, its slender body green and yellow, its great head silver-bright, it was half alive and half machine, monstrous and somehow magnificent. It found our tent, with Lupe beside it, crouched flat, sprang into the air.

The light flickered, and we were seeing through the hopper's eyes. We soared high above the sand, glided down on Lupe. We saw her look up, shock and terror on her face. We saw the hopper's arms reaching for her, saw its long black claws snatch her up, saw Ram pull up his pants, wave his arms, and run back over the ridge.

The hopper jumped. Ram and the tent fell away. Lupe's struggling body jerked and sagged, swollen as the claws drew her close. The dune below her swelled and shrank as the hopper rose and glided, swelled and shrank. The half-buried pillars expanded and vanished.

Alien music rolled again. Alien voices squealed. The desert faded into blackness, glowing hieroglyphs flying through it. When light came back, we were looking into a small, white-walled cell with close-spaced bars across the front. A folded blanket and an empty dish lay on a shelf along one wall. The toilet was a hole in

the floor.

Lupe lay on the floor, naked, doing push-ups. Her hair was wild, her face gaunt and thin, but set in grim determination. Abruptly she looked toward the door.

"Huh?" Beside me, Derek gasped. "Look at the devils!"

The barred door was sliding open. A thick snake of bright geometric bits slithered inside. It split into glittering piles. On her feet, fists clinched, she watched them grow into two cellular robots. I saw her lips moving, but heard no sound.

"Damn!" Ram whispered. "Not a thing we can do."

They stalked toward her, reaching for her with gleaming two-fingered hands, their crystal eyes blazing red. She flickered before they touched her, and they all were gone, fading into a rosy mist filled with trains of shining symbols. Unearthly music echoed from the pillars. Unknown voices spoke and died. The rosy fog brightened into sunlight. Once more we were staring through the empty gateway at the empty parkland and the empty avenue beyond.

"So she's alive!" Derek mopped at sweat on his face. "We've got to find her if we can."

"Fat chance," Ram muttered.

12.

"Well?" Ram peered at the empty stage between the pillars. "What was that?"

"A news broadcast, I guess." A shadow had fallen over us and Derek hunched against a gust of cold wind. "The robots are still on guard, watching the interstellar frontiers and reporting incidents. If the orders never change, they don't care."

"Lupe?" Ram shivered. "Where do you think she is?"

"No way to know." Derek shrugged at the bare stage where we had seen her. "On some other planet, I imagine."

"No way to get there." Ram shook his head and huddled against the sudden

wind. "Or to know what to do if we could."

The eclipse had begun, a huge black bite already gone from the sun. We sat waiting there through the darkness. It was never quite complete. The sun dwindled to a ring of fire and grew again.

"It's annular," Derek said. "The sister planet is a bit smaller than this one. Too small to cover the full disk of the sun."

Yet the shadow left us chilled with that glimpse of Lupe in some unknown prison.

We spent the afternoon roving the city in search of hope or direction, or even food and water. Our canteen were dry again, our feasts on the skycar merely memories. We rode the moving ways, tramped sidewalks and alleys, found pavements flowing out of the city, up the coast and down, toward the snow-capped mountains west. None flowed toward us.

"Why?" Ram frowned at a hieroglyphic road sign. "Why would they all be moving out of town?"

"There are scenarios." Derek shrugged. "You can imagine some kind of lethal agent at work, and the whole population in panic flight."

"Do we have any chance?" Absently fingering his birthmark, Ram squinted at the great half moon overhead. "A chance maybe to get at the traffic controls, wherever they are? Maybe to reverse the roads and get the skycar down again and get back toward home?"

"Not likely." Derek shook his head. "I imagine we'd have problems with the robots. In any case, we can't abandon Lupe."

Ram grunted, with a hopeless shrug, and we wandered on.

Like him, I was longing for home. We'd planned to be back from Africa in time for the spring semester. I couldn't help thinking of my empty house and unpaid utility bills and taxes, of my unmet classes and graduate seminars, of all the

friends who must surely be concerned for us. Ram was more stoic.

"Don't fret," he muttered when I spoke of Earth. "It will keep turning without us."

We found ourselves in what had been a residential district. Modest homes stood on stationary side streets that ran off the moving way, passing through parks and white-fenced paddocks where I saw horses grazing. Streets were clean, shrubs and lawns neatly kept, houses freshly painted, all of them empty.

"They were happy people, on the evidence we see." Derek stopped us to take photos. "They seem to have lived well while they did. Lupe would have loved to document their culture. It should have been a new sociology."

We saw robots at work, mowing lawns, tending flowerbeds, sweeping streets. Three of them were busy around a big machine digging a pit in the pavement, perhaps to repair a cable or drain. Another lay near them in the street. A pile of shining bits, it rose as we came near and shaped itself into a metal travesty of Ram, lifting a silver spear when he lifted his. Its crystal eyes blazed red, and its voice rang like a signal bell.

"Hello." Derek shot a picture. "Can you help us?"

It barked like an angry dog and waved the spear to warn us away from the workers.

Riding the pavements farther down the coast, we saw prosperous farms, barns and tall round silos, green fields and pastures with cattle grazing. I saw a robot on a tractor, another driving a sort of truck. No sign of human life. Ram sank into a stolid silence, but Derek led us eagerly on.

"A magnificent adventure!" Enthusiasm rang in his voice. "Magnificent! Nobody before us ever had a chance to learn so much."

He wanted to know the geography and history of the dead empire, the sci-

ANALOG

ence and technology of its builders, why they fought and how they had died. He hoped to learn the story of Ram's Little Mama, why she was marked with crown of worlds and how she had got to Earth. He wanted to know what the crown of worlds might mean for Ram.

Ram no longer seemed to care. Bleakly silent, he seemed almost angry when Derek spoke of the birthmark.

Derek always had to see more. We followed him to the fast center strip of a road that ran west out of the city. It lifted us into the foothills. On a bend where we came to a railed lookout point, Ram led us off and we stood at the curb looking back toward the ocean.

The city spread far along the coast, white beaches curving along the south horizon as far as we could see. Still water made a blue mirror in a wide harbor north. When Derek passed his little telescope, I made out ships at a line of docks. We found the seven trilithons where the sky car had left us and the lone one where we had seen Lupe in her cell.

"Let's get on." Derek nodded at the road. "I want to see what's over the hill."

"I'm tired." Ram shook his head. "I'm sleepy. Those feasts in the sky are a long time ago. Let's go back and look for anything to eat. Maybe a place to sleep."

Derek shrugged and we turned back, plodding along a narrow walk beside the moving way. Out of the hills, we followed Ram off the pavement to a farmhouse. It looked as if the robots had it waiting for the owners to return. Cherry trees in the front yard were bright with bloom. The path to the door looked freshly swept, the white paint was bright, red roses spread their fragrance from beds beside it. He tried his fingers on the lock plate by the door. It didn't open.

"Let's look for a garden." Hopefully, he led us around the house. "There might be ripe tomatoes. Maybe carrots and turnips, or potatoes we can dig. If we

find hens or eggs, we can cook up a feast."

Visions of the feast wet my mouth, but when we found a garden patch it was choked with weeds. The hen house and the barn were empty. We tried the dwelling again, but all the doors and windows had been well secured. We left the place and trudged on to a moving road that carried us back toward the city center.

We got off that in what must have been a shopping mall, a large square surrounded with scores of shops along a red-tiled gallery. The tempting scent of baking bread led us to a food shop, its window full of pies and cakes. The door was locked.

The sinking sun was lost behind a storm cloud that hid the mountains west. Thunder crashed and a cold wind rose. An icy drizzle turned to driving rain. Drenched and shivering, we left the mall for an empty street. Ram tried his key on the lock of a vacant dwelling. When that failed, he kicked at the bricks around a flowerbed and found one loose.

"If they were human," he muttered, "they must have eaten. They must have slept. They must have left us something."

He smashed a window and we crawled through into a kitchen.

"Interesting!" Everything inside looked strange to me, but Derek explored it, finding what he said was a cook stove, freezer, and perhaps a meal dispenser. That failed to function when he tried to work it, but the house was at least dry and warm. We stripped our wet clothing off and drank water at the sink.

The pantry and the freezer were empty when Ram got them open, but we spent the night there, enjoying the luxury of warm beds in individual rooms. I slept and dreamed that I was back at Eastern, assigning a freshman English class to write a research paper on the history and technology of interstellar trilithons. Ignoring me, the students ordered pepperoni pizzas that they ate at

their desks, never offering to share a crumb with me.

Ram and Derek were up before me, exploring the house. There was no breakfast, but Ram plundered the absent owner's closet. His boots were badly worn. He found a pair that fit well enough, and a pair of pants that was only slightly too large for me.

Derek was fascinated with a little box he discovered on the table by his bed. It was about the size and shape of a paper-back. An oval black plate on the side of it glowed red when he pressed it, and lines of green hieroglyphs shone and vanished.

"I think it's a book," he said. "Maybe electronic. Likely linked to a whole library. If we knew how to open it—"

He spent half an hour tapping trial codes into the plate and squinting at the flashing symbols. He had Ram try his emerald pendant. It may have been a book, but it never opened. We left it on the table.

Ram took his brick when we left the house. The mall was empty and silent as ever, but a bell note rang from the food shop as we came near. Hieroglyphs danced over the door and the air was suddenly rich with the aroma of roasting meat. A spit was turning in the window, brown juice dripping.

Ram tried his pendant on the door. It didn't open. He knocked and yelled. When nothing happened, he swung the brick at the window. It was something tough, but his third blow shattered it. He gave me the brick, scrambled inside, jumped back.

A great robotic snake came after him, barking like a vicious dog, its glittering head changing into a metal mockery of his. Alarms squalled, so loud they hurt my ears. All around the mall, crimson glyphs flashed. Doors bust open. Robots slithered out and swarmed after us, crystal eyes burning red in strange heads shaped after Derek's and mine.

I thought we were done for, but Ram snatched the brick from me and turned back to throw it at the snake in the lead. The snake formed a many-fingered hand and extended a shining arm to field it. He waved his bamboo lance. The robot arm became another waving lance. He waved his emerald pendant. The snake came on.

"That way!" He caught my arm. "Let's get to the pavement."

I ran with him. Derek turned back to aim his camera. The snake stopped, and its lifted lance became a mock camera. He snapped a photo. A crystal disk flashed white and green and white again.

"Come on!" Ram shouted. "While we can."

"They haven't hurt us." Derek stood still. "They weren't made to harm anybody. Could be they're trying to signal."

"Could be," Ram muttered. "But we don't know."

He tugged at my arm. We ran on. Derek followed us. The robots swarmed after him, but terror gave us speed. We got out of the mall and jumped on the moving pavement. Ram looked ahead, pointing.

"That trilithon! The one where we saw Lupe. It could be another gate. We didn't try the key."

"We can try," Derek nodded. "Another world to see if it does let us through."

We got to the rapid center strip. Behind us, the robotic serpents stopped at the curb. Derek took another shot and we turned to the trilithon, immense and black against a crimson sunrise. Green symbols shone across the columns when we came over the curb. Ram gripped my arm to take me faster. Derek stopped to look back. I saw his jaw sag. A brazen bellow thundered out of the sky and echoed against the trilithon.

"The joker," Derek murmured. "They're playing the joker."

I saw a gigantic hopper gliding down toward us.

"Upesi!" Ram gasped. "Quick! We've still got a chance."

"The luck of the game." Derek grinned. "We were looking for Lupe. It's the only chance I know."

He left us and walked back to meet the diving hopper.

13.

The hopper bellowed again. I glanced up and horror froze me. It came straight down at Derek, the sun mirrored on its huge silver head, its great legs extended to cushion its weight, its cruel black claws reaching to snatch him up. He stood still beneath it, his camera lifted for one final shot.

"Run!" Ram yelled. "While we can."

The beast was too strange, too vast, too close. Terror held me, and dread for Derek, but we had to run. Gasping for breath, we stumbled past the bank of seats below the pillars. I glanced back. Derek stood looking up into the red glare of the monster's eyes. I thought I saw a smile.

"Fool!" Ram whisper seized my arm. "But if he finds her—"

He snatched for his pendant and hauled me through the trilithon. The world tipped under me. My breath went out. My ears rang. The morning sun was gone. Off balance, I staggered into dead black midnight, stumbled and kicked something that rattled in the dark. A cold wind struck me. It had a piercing burnt-sulfur edge and a faint taint of vegetable rot. It brought back the root cellar where my grandfather used to store fall crops of potatoes and squash and tomatoes on the vine till most of them decayed.

We stood there till our eyes adjusted and the stars came out. The Milky Way was still more or less the same, but we had skipped again across the galaxy. I found no moon. A huge red star burned near the zenith, so bright that I saw bones on the ground around us, the skeletons of animals and men. I'd kicked a human skull.

Shivering, we crept behind one of the great pillars to get out of the wind and huddled together for warmth until the red star had set and a white sun rose. It showed us a circle of standing stones out around the lone trilithon and ashes of dead campfires scattered over the rocky scrap of level ground where it stood.

We were on the flat summit of a barren butte, maybe the core of another dead volcano. It was only a mile or so across. We walked though the barrier stones out to the rim. A sharp and sudden drop. I crept as close as I dared. Far down below, I saw a carpet of green jungle. A wide, mud-red river wound across it. I saw no mark of any human presence, and no way off the butte.

Ram nodded at another yellowed skull grinning at us out of the bones beside a pile of ashes. "An unlucky native. Or maybe crazy, if he climbed up here." He squinted at me. "What do you think?"

I shrank from the rim.

"Let's get back to the robot world and try another trilithon. If this will let us through—"

We went back inside the circle. Holding the emerald pendant ahead, he took my hand and went walked back between the pillars. I felt no shift of gravity, heard nothing in my ears. The time-bleached bones still cluttered the bare rocks around us.

"A one-way gate." Ram shrugged, with a dismal grin. "I guess we're here to stay. Maybe in my Little Mama's hell."

Our feasts on the skycar were worlds behind, and I was giddy with hunger. Our canteen still full, we wet our bitter mouths and walked back toward the rim. Ram had lost his bamboo spear. He kicked at a little pile of bones and shriveled leather that had been boots and clothing and picked up a rusty blade.

"Still wicked enough." He tried the edge with his thumb. "Something we could need—" He glanced ahead and his voice changed. "Maybe right now."

A man was clambering over the rim.

He got to his feet, looked down behind him, and came on by us at a limping run, carrying a sort of machete. He was naked to the waist and dark as Ram. One eye was swollen shut, half his face caked with clotted blood. With only a glance at us, he ran through the trilithons, came back through, stumbled around one column and then the other.

"He's not the first." Ram made a grim little nod at the pile of bones. "They get here with no magic key."

The fugitive looked back at the rim and limped to crouch behind the trilithon. A pursuer scrambled into sight and stopped to stare at us. Another black, he wore tall boots and a dingy red breechclout. He carried a crude leather backpack, and weapons hung from his belt.

He shouted and came on toward us. As tall and muscular as Ram, he looked savage. Yellow tiger stripes were painted around his bare black torso and his face was a fright mask done in white and scarlet. Ram gripped his rusty blade. I shrank behind him.

"What a welcome!" he muttered. "One of Little Mama's demons?"

After a moment the man looked back at the rim. Another black came scrambling over the rim, then another, till I saw six. Tiger-striped like the leader, they carried long spears. With only a glance, they marched past us through the trilithon.

I looked at Ram. "What can we do?"

"Nothing. Nothing but hope for a break."

"Wait for a break." He shrugged. "It's all we can do."

The fugitive came limping back through the trilithon, the spearmen behind him. He had lost his machete, and fresh blood shone red on his arm. The fright-masked leader snapped a command. He squatted on the ground, head drooping in abject misery, blood still dripping from the wound.

With one spearman left to guard him, the leader brought the others to surround us and inspected me as if I were

somehow remarkable. He peered into my face, lifted and turned my hand to look at the skin. He was feeling the fabric of my jacket when one of his followers shouted and pointed at Ram. The crown of worlds seemed startle them. They whispered to each other, shouted at the leader, dropped to their knees.

The leader bowed to Ram and intoned something I thought was a prayer. Ram looked startled and said something to him. He answered. They talked, Ram's words halting and slow, often repeated. He studied the birthmark, gestured at the trilithon, grew animated, bowed again. One of his men picked up Ram's blade and handed it back. He bowed again, called his men off their knees and took them back to huddle around the captive.

"You'd never believe it!" Ram shook his head at me.

"You know the language?"

"I've learned his name." Ram nodded. "Ty Toron. He wanted to call me Ty Chenji. The Ty must an honorific. The crown of worlds seems to daze him. He seems willing to believe we got here through the trilithon. That seems to awe or maybe frighten him."

"How do you know?"

"It comes back." He turned to listen to the leader and his chattering men and stood for a moment staring into the hazy gulf below the rim. "It was the first language I knew. My mother died when I was born. My grandmother worked with my father, making the curry and filling the bowls when he sold it on the street.

"My Little Mama took care of me. My father tried to scold her for it, but she used to croon songs in me her own native tongue when she was rocking me to sleep. Songs about Anak, the noble black king, and Sheko, the white witch who murdered him. I'd almost forgotten, but it's all coming back."

One of the men prodded the captive back to his feet at the point of a spear, and Toron led us off the mountain. I

asked where we were going.

"He tried to tell me," Ram shrugged. "Something about Blood River. Something about slaves. Nothing I understood."

We climbed down a hazardous stair the trilithon builders had carved into the cliffs. Toron led the way, with Ram and me ahead of his spearmen and the captive. The steps were no trouble for him or Ram, but I had to cling close to the wall, ashamed of my dread.

Trying not to look into that sickening gulf, I counted the steps. One thousand steps. I couldn't help looking. My empty stomach roiled. Two thousand steps. I was trembling and wet with sweat. Two thousand, one hundred and eighty-eight before we got down into the green gloom of the rain forest, safe at last on solid ground. I pitied the captive moaning and staggering behind me.

The path into the forest had once been once paved with cobblestones. Most of them had been washed away or buried under mud. Twice Toron sent men ahead to hack a better way through dense undergrowth. We stopped once to rest. The men opened their packs and found bread they shared, brown pones that looked like the corn Dodgers my grandmother used to bake. They were hard and dry, but mine turned sweet as I gnawed it. We slept that night on a bed of fallen leaves beside the trail. Dusk was darkening next day before we reached a little river with long dugout canoe beached beside it.

A man left to guard the boat had killed a wild pig. He had it roasting on a bed of coals. I felt famished, and it was delicious. Toron let Ram and me sleep that night in the canoe, which had been carved from a single enormous log. Next morning they dragged it back into the water and paddled down the stream.

We came to shallows where the men had to wade and pull the boat, and several times we stopped to let the men forage or hunt. Toron stopped us again at a ruined shrine and had the men clear

away the jungle that covered two great figures side by side on a throne, the black giant with the crown of worlds on his forehead, and his white woman companion, an altar before them.

"Anak," Ram murmured. "And Sheko. It comes back to me now. He was the hero who brought men to the world. She was his queen. She grew jealous when he loved a human woman, and killed them both."

The men kindled a fire on the altar. Toron had Ram stand behind it while he led his men in a chanted litany and then slashed the captive's wrist, caught blood on a slab of bread, and burned it in the fire. Ram stood there in the smoke, his features set hard, staring off into the jungle. I saw a likeness to the figure of Anak that a chill down my spine.

Late that day we reached what must have been a city. The river ran through it in a stone-walled channel that was overhung with trees. I caught glimpses of great stone columns towering out of fallen masonry, but Toron made his men lean to their paddles. They didn't want to stop.

On the seventh day we reached Blood River. Dyed red-brown with upstream silt, it was an inland sea, stretching flat for a mile or more to the jungle wall beyond it. The men laid their paddles down when we came into it, bowed to Ram, dipped its dark water from their cupped hands, drank to him.

Looking uncomfortable, he bowed in return and muttered his thanks.

"I'm happy they didn't kill us." He gave me an uneasy frown. "But I don't like to be taken for any kind of god. I don't want the consequences."

I couldn't help thinking how far we had come from our classrooms at Eastern, or wondering if we would ever get back.

The captive lay sprawled on the floor of the canoe. I think he had a fever. For a day or two he had seemed to be hallucinating, shouting, screaming, chanting in

an eerie monotone, but now he was sunk into a lifeless torpor, never moving except to whimper for water. Flies buzzed around his untended wounds.

14.

Blood River was home to the men. They laid their paddles down, content to let the dugout drift with the current. I was shivering, hungry, scratching at swollen insect bites, wet and shivering from a drizzling rain, not so happy with the river.

Running fast and high, it threw me into a dismal depression. It was too vast and too strange. The endless flat bends reached on forever, twisting from jungle wall to jungle wall like a monster serpent crawling. It had cut its channel ages before the trilithons were built. It would still flow on after the last life was gone. We were helpless atoms, lost in its uncaring current.

Ram was more cheerful, or at least more stoic.

He tried to help the moaning prisoner, bringing him water when he whimpered for it, offering him a crust of bread he couldn't eat. He found a handkerchief in his pack and tied it around the wounded arm to keep the flies away.

The rain ceased at last. A pale sun shone through to clouds. Yet still a terrible loneliness haunted me. I saw a few high birds. A fish jumped now and then. Once a gaudy butterfly perched for a time on the prow. But I saw nothing human, nothing else alive.

Ram was learning more of the language and trying to teach me. The men stared at his birthmark and whispered among themselves until Toron hushed them. He kept an uneasy silence with them, but he shared his apprehensive uncertainties with me.

"They think I'm a messiah the priests have been predicting. A son of Anak, sent to lift the curses Sheko left upon the world and set things back to right." Gazing into a bend where high water had undercut the shore and great trees had

topped into the river, he paused for wry little shrug. "No job I ever wanted."

The river carried us past dense stands of palms and bamboo, with taller forest inland. We saw no work of man until Toron pointed out a marble-white pyramid, far off in the jungle. It looked as vast as those at Giza. He said it was the tomb of Anak.

Ram asked if he had ever been there.

"Who would go there?" The question seemed to alarm him. "Sheko breathed death upon it. Fools have tried to enter it, and died of fevers that rotted their bones."

He had the men paddle to keep us far across the channel from and they kept an uneasy silence until it was well behind. I wished Lupe had been here to make what she could of this folklore and myth.

The hard bread and a few scraps of dried meat had run out. My stomach growling, I rejoiced when the men threw hooks in the river and grilled their catch over charcoal on a pile of dirt in the bottom of the boat. A group went ashore and came back with bags of fruit and nuts and a straw basket filled with combs of wild honey.

We filled ourselves again and Ram huddled with Toron in the bow, learning what he could of the planet's geography and history.

"I don't get half of it," he said. I don't have the words or the background I need, but he's literate and intelligent. He's been to school in Periclaw. That's the capitol, down at the mouth of the river. He's not sure what to make of the birthmark—no more than I am. But he wants to know who we are and he likes to talk."

"Get all you can," I urged him. "Get us back home."

"Worlds away, but I'll do what I can." He shrugged and shook his head. "I guess we're lucky to be respected, but I didn't come here to lead any revolution. I don't like a game where I don't know

the stakes."

Toron was telling him something about the planet. It had two major continents, with names Ram translated as Norlan and Hotlan. Norlan lay over the pole, most of it under an icecap. A white race lived on the fertile peninsulas that reached into warmer regions. Toron despised them.

"They're the curse that Sheko laid upon the world. Arrogant tyrants! They think they own it. Bloated spiders, sucking our blood till they bleed us dry."

Hotlan straddled the equator, with a chain of high mountains along the west coast. The great Blood River drained most of it, flowing toward the east. Its natives were black. Their civilization had been high when Anak ruled them, but they lived like jungle animals now, Toron said, since Sheko breathed death upon the world.

Norlan claimed it he said, and tried to rule it.

"It too big for them to swallow, but they try with a high commission based in Periclaw and gunboats on the river." He let his fright-mask grin. "The slave masters may be fat, but in the end Sheko's curse will rot their guts."

Ram and I were sitting in the bow of the dugout to keep as far as we could from captive, whose untreated wounds had begun to smell. Ram glanced back at Toron, who was taking a turn at the paddle, keeping us well out in the rapid current.

"I don't know how much truth he tells us, but he does spin a colorful tale. He says he was a slave on a cotton plantation, down on the delta. He respected his white master, or so he says, working hard to earn fair treatment. He rose to be a field boss and got transferred to the cotton gin. The master was letting him learn to read and write, to keep the gin records, when he lost his temper and knocked out an abusive mulatto overseer. He ran away to save his life and found his mother's people in the jungle.

"He lived with them and learned their ways. He was a guide for an expedition searching the jungle for ruins of the old civilization. They found no gold. The explorer refused to pay his porters. They murdered him. White authorities captured them and auctioned them in the Periclaw market.

"I don't know how to take him." Ram glanced again at Toron, bent over the paddle, magnificent muscles rippling under the tiger stripes. "I want to admire him for all he's done, but life seems to have left him a cynic, with no loyalty to anybody. He's a bounty hunter now, running down runaway slaves."

Ram nodded at the wounded man snoring in the stern.

"That poor fellow has a price on his head for trying to organize a slave revolt. It was crushed, and he was trying to escape through the trilithon. Hoping, Toron says, to bring back that prophesied liberator. A fool's errand, but fools do believe the legend."

Ram made a wry face.

"Toron knows the legend, but he's only half convinced. Willing to treat me like that liberator, just in case it's true. Ready to let us hang if it's not. His main concern is to deliver his prisoner to a government outstation down the river and collect his bounty money."

Next morning the empty loneliness of the river lay heavy on me until Toron made out a tiny puff of black smoke far ahead. We paddled into a thicker of reeds in the shallows and hid there while a small steamer crept by against the current. I made out a long-barreled gun on the flat foredeck and bales of something stacked aft.

"A government packet," Toron spoke and Ram translated. "There's an excise duty on river traffic and a tax on slaves. They'd want to see official permits and search the boat for contraband corath beans."

Toron grew animated when Ram asked about the beans.

"The corath is a sacred tree. He says

the first were planted by Anak himself, to show his people the way to paradise. They grow only at a few spots deep in the jungle where the soil is right. He says there's a secret brotherhood that worships the tree. They drink a wine made from the nuts that gives them sacred visions.

"A sort of narcotic, I imagine. He says a lot of whites are now addicted, users evading the taxes. Prices for the nuts are so high that they've become the chief currency here in the forest. The harvest is a risky business, because Sheko breathed death on the sites where they grow."

Three days down the river we reached Hake's Landing.

"A new deal ahead." We were coming around a bend. Toron pointed at a dull red dot in the green wall of jungle on the bank ahead. Ram gave me a twisted grin. "Another game, with maybe our lives at stake and rules we never know."

He had been an avid poker player, and now he seemed cheerfully eager to see our new cards as they fell. For Derek and Lupe, the new knowledge they wanted was worth any risk. For me, the game had become too strange. My own goal was becoming sheer survival, and I saw little to gain from what I saw as we came to the landing.

A little red brick fort on the point of a granite ridge that thrust into the river bend. A bright sun glint on a brass cannon on top of the fort. A gnarled oak tree on a level drill field. A stake palisade around a few buildings. The dark jungle wall beyond, with all the secrets and hazards it hid. They had begun to prey on my imagination.

Toron had asked to see our papers. We had no papers.

"You'll have to report to the agent," he said. "You'll have to register. But first I'll ask Trader Hake to help you if he can."

Toron beached the dugout at a wooden pier and left us there with a guard

while he marched his limping prisoner to the fort. We waited, sweating under the tropic sun and slapping at stinging insects, till he came back and escorted us to a palm-thatched building inside the palisade.

Trader Hake was a tall rangy man with close-set eyes in a long narrow face and a sharp little tuft of iron-gray beard. We found him standing behind a cluttered counter, haggling with three black men who wanted to sell him a little black carving they said was a sacred seal of Anak they had found in a hidden tomb. He studied it under a lens and sent them away.

"Made yesterday," he told Toron. "In Periclaw. I know the tool marks."

He listened to our story and scowled in doubt. He wanted more details, tried to question Ram and me, looked at the birthmark with his lens, and finally sent us back to the commission agent, who lived in the fort.

A black man in a stiff blue uniform stood guard with a heavy musket outside the agency door. He shouted through an open window and the agent bustled out to gape at us in annoyed surprise. He was naked to the waist, a short bald man with a stubble of beard on a fat red face and pale eyes blinking at us through thick lenses. Strong perfume failed to cover his unwashed odor.

He shook his head at the trader, squinted at the birthmark, frowned over my watch, studied my skin, finally shook his head and called through the window. A sleek black woman came out to join him, a brown-skinned baby in her arms. He had her open our packs and inspect everything we had, and finally took her aside to hear her advice.

Ram motioned Toron aside.

"We're in an iffy fix." He came back to give me a quizzical look. "It's the crown of thorns that worries them. They're afraid of me, afraid I'll set off another slave rebellion. Hake doesn't want anything that might wreck his business. The

ANALOG

agent wants no problems with his bosses in Periclaw. They'd like to string the two of us up along with him."

He nodded grimly at the solitary tree.

"Toron is trying to convince them that we did come through the trilithon, the way the gods did. He's warning them that I might be more dangerous as a martyr than I am alive. The birthmark could be a tattoo, a trick they've seen before. You complicate the problem with your white skin and your watch and your clothing. They don't know what to with us."

The agent and his woman came back to confer with the trader again, and both spoke to Toron and Ram.

"They've reached a sort of verdict," Ram told me. "The agent has put us under house arrest. We're confined to the settlement until he can report the case and get orders from his authorities down the river at the capitol."

I asked him what he thought.

"No time for panic." He patted my shoulder. "Our luck has run wonderfully well. We can hope it holds up."

"That's hard to do."

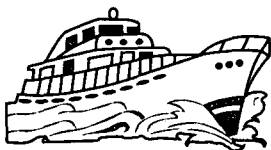
He shrugged and gave me a thin little smile.

"Think about it, Will. We've made great history if we ever get back to tell it. Derek and Lupe will never be sorry we came, no matter what. We may yet stumble on some way to help them. For their sake we've got to hang on."

He held out his hand and gripped mine hard when I took it.

I resolved to hang on, to trust our luck, to take each day as it came. But next day we found the rebel slave hanged from the oak on the drill field, an iron hook through his ribs. Carrion birds were already perched above him, but he was still alive, whimpering feebly. I found him hard to ignore. ■

To be continued.



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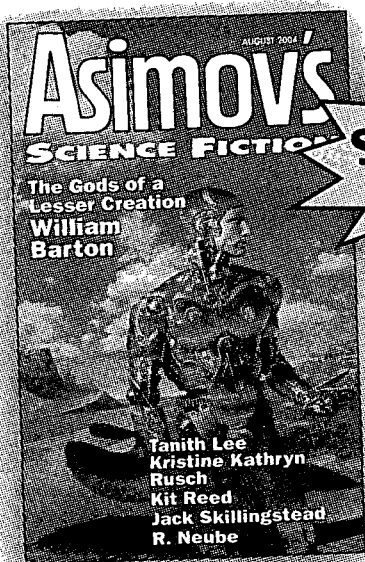
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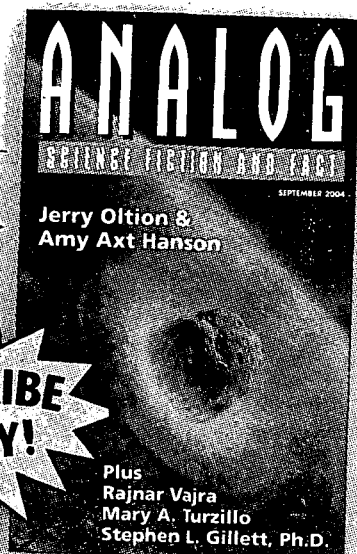
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Where Are They?

Thomas Donaldson

Recent research in astronomy
and planetology
casts a whole new light
on the likelihood of life.

Fermi originally asked that question about other intelligent life forms in the universe. He was saying that if they existed at all then they'd be quite easy to find. At first, with many arguments that interstellar travel would be too hard, Fermi's question seemed not to bear on the problem at all. But then Freeman Dyson, Robert L. Forward, and others suggested methods which might very well let us visit the stars. Even the problem that our lives are too short for such travel has immortalist scientists and others at work to slow and someday abolish aging. With such developments, Fermi's question becomes even more pressing.

To ask where they are comes down to asking for locations of habitable planets—that is, planets where we could live without special equipment. Ever since Copernicus, many speculated about planets as habitable as the Earth. Two hundred years ago, most people be-

lieved that all the planets would be habitable. However as astronomers looked more and more closely at this question, they found fewer and fewer planets likely to be habitable. If we found lots of habitable planets, we'd also expect lots of other intelligences, too. It's not that every habitable planet must grow its own intelligent species, but that a proportion of them would. Given lots of such planets, even a low proportion would come to a large number.

In many science fiction stories we meet civilizations basically about the same age as our own. Yet as it turned out, habitable planets could have formed eight billion years or more before the Earth. Not just where are they, but *when* are they? To believe in lots of civilizations with similar ages to ours by now looks as much of a fantasy as the old notion that Mars was habitable. One billion years ago, the Earth existed, but at best had very primitive, single-celled life, and

¹Other than those which look quite artificial. I will not discuss them further here.

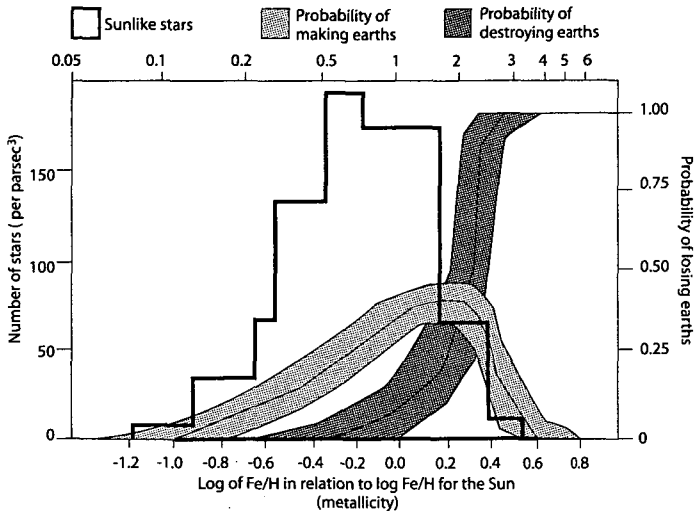


Figure 1: How the Growing Mass of Heavy Elements in Stars Destroys Habitable Planets

This diagram may at first seem complex. However, it basically shows how as metallicity of the parent stars increases, the probability of producing a habitable "Earthlike" planet decreases. Since chance plays a role in this process, note that the probability of forming an Earthlike planet does not go to zero just after the probability of making a hot Jupiter starts rising. Instead there is a range of metallicity in which either one can happen. Beyond those levels, however, the probability goes to zero.

The bottom axis shows the log of the ratio of metallicity to that of the Sun; the top axis shows the actual ratio of metallic elements (for astronomers, any elements with atomic numbers higher than Helium) of the star to that of the Sun. Note that 0.0 on the bottom axis corresponds to 1 on the upper axis. Metallicity here is always measured in relation to that of the Sun. To use absolute levels would involve us with larger numbers which only have meaning as their ratios.

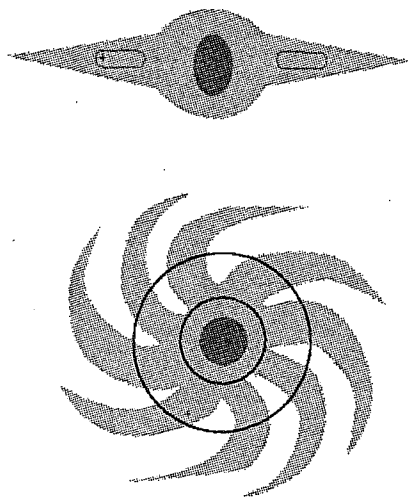
This diagram is adapted from Figure 1 of Lineweaver's paper (cited in the references). It lacks an additional graph showing the hot Jupiters so far found.

some simple multicelled life, living in its oceans. And algae, too, so it had oxygen in its air by then. An ideal planet for colonization! In short, if we assume many habitable planets, we must explain how we ourselves came to exist. And the best explanation for our existence assumes that very few if any habitable planets exist except the Earth... for which, so far, no one has found any explanation¹. Despite this, every time workers have looked at this question, they've come up with fewer habitable planets than before. In itself this suggests a lot about our future, which I shall discuss at the end

of this article. So what are current ideas about habitable planets in our galaxy?

Here Is What Astronomers Have Said On This Question:

As a first cut, early on astronomers worked out that they could eliminate most stars. Only stars of particular spectral types (from early K through G through late F-type main sequence stars) had any chance of habitable planets. Most stars are dim red dwarfs, of types early K down to M, and outnumber F, G, and late K stars by a factor of about 150 to 1. Such stars have habitable

**Figure 2:****The Habitable Annulus in Our Galaxy**

This picture shows two sketches of our galaxy, the Milky Way, one from the top and the other from the side. I make no pretense that the galactic arms correspond to those of our galaxy, though of course it has such arms. The dark area is the dense galactic center. The two circles show the inner and outer radii of the habitable annulus. These boundaries are not as definite as those of the habitable annulus around stars. They are defined by probability, and both habitable and uninhabitable systems can lie relatively short distances inside or outside the annulus. Gonzalez, Brownlee, and Ward did not give any fixed figure for the radius or height of this annulus in their papers. But in an Oct. 11, 2001 article in *Scientific American* they do come out with a rough estimate: an inner radius of five kiloparsecs (~16,000 light years), outer of about 13 kiloparsecs (~42,400 light years). Note also that this habitable annulus does not extend from top to bottom of the galaxy. It is surrounded on all sides by "uninhabitable" regions.

The cross shows where our Sun lies in the habitable ring.

zones too close and narrow; any planet close enough to get enough energy from the star will not only have its rotation fixed, but get flares and any other output from the star. Stars of high spectral types, from A to B and O (Sirius is an A-type star, and the nearest one of any of those 3 types) have too short a lifespan on the main sequence for any life to develop on any world in their planetary systems. They don't even have time to make a planetary system: O-type stars live less than 10 million years. An A-type star such as Sirius remains on the main sequence for about 250 million years. It took 2.5 billion years for the Earth to settle down and bear any kind of life at all. O and B-type stars end their short lives as supernovas. The closest B-type star is Achernar, at 69 light years.

These thoughts about habitability came early, in the 1950s. Several workers

worked out theories of planet formation, some with computer simulations from which we could get statistics on the number of habitable planets in the galaxy. However actual work to find such planets and verify those theories remained something for the future ... until astronomers began to find planets of other stars which no one had predicted—not habitable, but planets the size of Jupiter or greater, with orbits very close to their mother stars. Experiments had once more trumped theory. Such planets have gotten various names, but I shall call them "hot Jupiters" here. Almost all stars with hot Jupiters were G type, the same spectral type as the Sun. Their discovery led to explanations of these hot Jupiters and deeper studies of how planetary systems might form.

Just what stars would form hot Jupiters? Most astronomers decided that

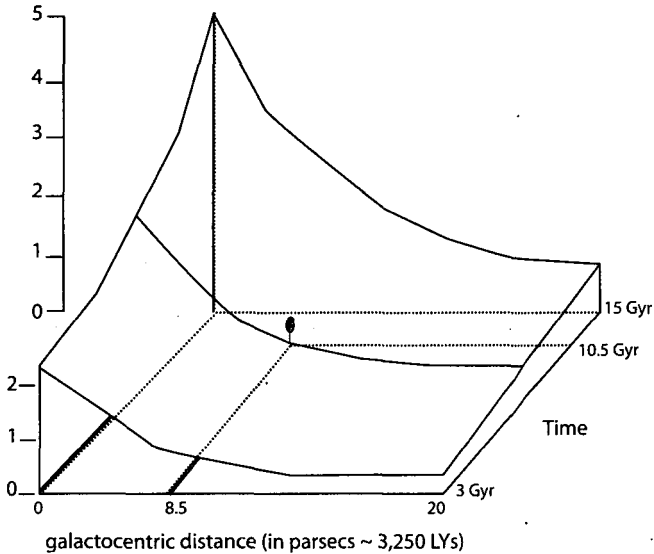


Figure 3:
How The Mass of Stars Increases With Time And
Decreases With Distance From The Galactic Center

The basic figure here comes from the paper by Gonzalez, Brownlee, and Ward. In their paper they show each relation, between time and mass, and between distance from the galactic center and mass, as a separate graph. I have combined these graphs into a single 3-dimensional graph. Planetary mass is shown as the vertical axis, with the masses given as multiples of that of the Earth, i.e. mass of Earth = 1. Distance is measured in kiloparsecs (units of 3,260 light years). Time is measured in gigayears, i.e. billions of years. Earth is shown on the diagram as a black dot, with its distance from the galactic center (8.5 kiloparsecs) and present time (10.5 billion years since the galaxy began) shown on the distance and time axes. The masses are shown on two different axes, with the surface showing how they vary with time and distance from the galactic center, causing any lines beneath it to become dotted lines.

hot Jupiters began at distances like that of Jupiter from their star, but as they grew tidal forces made them move closer and closer, disrupting any Earthlike planet as they did so. Three astronomers, Bodenheimer, Lissauer, and Hubickyj, tried to see how hot Jupiters could form near their sun, but admitted at the end of their paper that migration toward their sun looked much more likely. Another astronomer, Charles Lineweaver, looked at the stars which formed these hot Jupiters. They all turned out younger than the Sun. Any star younger than the Sun will very likely have higher metallic-

ity (astrospeak for elements higher in atomic weight than helium (He)), just like the clouds from which they grew. A bit of calculation showed that any gas giant formed in such a system would generally grow more massive than Jupiter. And as suggested, tidal forces on such gas giants would make their orbits move closer and closer to their star, eating up most bodies closer to their star along the way. Figure 1 is a graph from Lineweaver, showing how over time, stars younger than the Sun become more and more likely to form hot Jupiters. Only stars older than the Sun

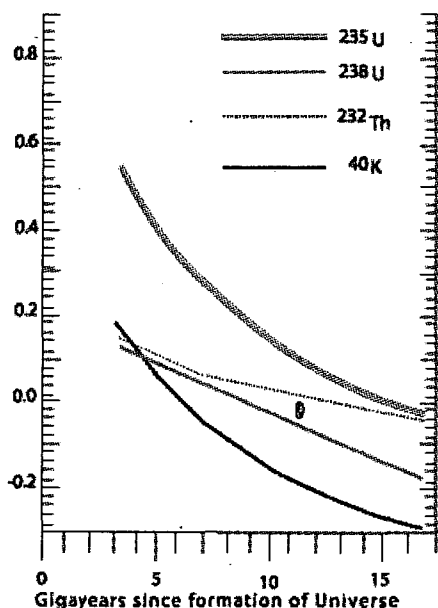


Figure 4: Changes in Levels of the Four Critical Radioactive Elements Over Time

This diagram is taken almost directly from Gonzalez, Brownlee, and Ward's paper. It shows the levels of the four elements involved in heating an Earthlike planet's core, 4.6 billion years after its formation. The levels (the vertical axis) are given as a logarithm of X/Fe compared to $\log (X/Fe)$ for the Earth. The horizontal axis gives time in gigayears (billions of years). The critical radioactive elements are listed on the diagram: ^{235}U , ^{238}U , ^{232}Th , and ^{40}K . The Earth is shown as a black dot on the diagram. I have also omitted the error bars at the locations of the Earth. These levels for other planets may well be somewhat inaccurate.

would make cold Jupiters and keep their smaller inner planets (note the position of the Sun in Figure 1).

With metallicity turning out so important, two astronomers (G. Gonzalez and P. Brownlee), and one geologist (P. Ward) looked at all the work astronomers had done measuring metallicity levels throughout our galaxy. We now know much more than before about the levels of heavy elements (i.e. metallicity) in stars of different locations. Even stars in the galaxy have fewer heavy elements the farther they orbit from the central bulge. Astronomers had known for some time that stars in globular clusters have significantly fewer heavy elements than disk stars; this work told us about disk stars too. This work suggested that habitable regions within our galaxy formed a ring, just like habitable regions around stars. Habitability also fails if a star orbits far enough from the habitable disk, perpendicular to it. In *Science*, Lineweaver and others recently presented more calculations about this habit-

able ring, not only verifying the ideas of their precursors but carrying them a bit further. Figure 2 gives a rough schematic for the habitable ring proposed by these astronomers.

Basically, stars orbiting too far from the galaxy's center would be older and so have too few heavy elements. Rather than forming Earth-sized planets, at best they might form planets the size of our Moon. Recently astronomers found a planet orbiting a very low-metallicity star in a globular cluster; this doesn't change the conclusion here: the planet was a gas giant. (However, it does suggest that planets can form simply from clots of gas with little hard matter).

Why a ring rather than a circle? If a star lies closer to the galactic center, any planet formed would meet with many more catastrophes in its history than the Earth. Density of stars in the disk (the number of stars per parsec³) increases towards its center. This means more nearby supernovas and gravitational tides from passage of other stars. Such

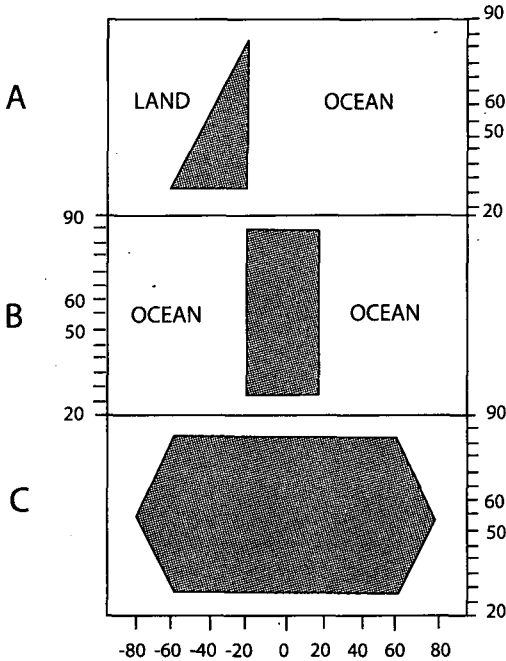


Figure 5: Obliquity Changes and Habitability for Advanced Life Forms

The three diagrams shown in this figure compress similar diagrams in a paper by Williams, Kasting, and Caldeira. The horizontal axis at the bottom gives latitude. The vertical axes along the sides show the results of obliquity at various angles given on the sides, from 20° (close to the present obliquity of the Earth) to 90°, where the rotational poles lie horizontally. A horizontal line at a given obliquity will (usually) pass through a darkened area. The percent of this line that does so tells the percent of the planet which is habitable. Yes, if it passes through NO darkened area, then no areas of the planet are habitable.

"A" shows the areas habitable at different obliquities for a southern supercontinent. The land area to the left of the dark (habitable) area is covered with ice and uninhabitable for all obliquities. Note that at higher obliquities the habitable area shrinks more and more until 90% of all the land on the planet has its land area entirely covered by ice. "B" shows how habitability varies for a single equatorial supercontinent. Here habitability varies very little with obliquity, but remains small relative to "C," in which land is present in more than one continent of various sizes. The areas outside the dark areas in "C" will still remain uninhabitable, however. Later work by these authors made the implications of obliquity and continental location a bit fuzzier: sometimes even polar supercontinents would retain more habitability. Even so, major climate changes every 10 million years doesn't look good for complex life forms.

At one time the Earth had a southern supercontinent, which later broke up with pieces attaching themselves to more northern lands ... except for Australia, which remains its own separate continent. Because of our moon, these changes caused no insurmountable problems for Earth life forms.

tides from other stars need not directly affect any planets; it would be quite sufficient for those tides to cause more meteor showers to rain down on these planets much more often than on the Earth; and supernovas would affect climate and life forms more often, too. Even tidal disruption of the orbits of planets by passing stars would happen more often. On top of all this, metallicity would increase faster close to the galactic center, so that more stars will form early hot Jupiters rather than habitable planets.

Among their results from their later study in *Science*, Lineweaver and his colleagues found that habitable planets could have formed as long ago as eight billion years, and had an average age of one billion years older than Earth. The earliest such planets (unless managed by some unknown intelligent species) would by now have lost their habitability.

Finally, since main sequence stars grow brighter as they age, time plays a role in the habitable zone around stars. Metallicity, and hence the likelihood of habitable planets at given distances from the galactic center, depends on time, too. Figure 3 shows this relation, but doesn't deal with appearance of hot Jupiters as metallicity increases.

And Then Geophysicists Chimed In

The team proposing a ring of habitable systems contained a geologist, too. Gonzalez, Brownlee, and Ward raised points in their paper that Lineweaver and his colleagues didn't directly deal with in their later paper. Geophysics tells us even more about habitable planets. Its inner heat allows the Earth to have both plate tectonics and volcanoes. This inner heat comes from four radioactive isotopes, ^{235}U , ^{238}U , ^{232}Th , and ^{40}K . All of these elements need supernovas to make them. Early in the galaxy's lifespan, many supernovas occurred. Since then they have become more rare,

about one every 30 years in our whole galaxy. G-Type stars forming earlier than the Sun would have fewer heavy elements, but a higher proportion of radioactive elements to cause plate tectonics and volcanoes. However, the actual amount of heat produced over time, even in planets born 8 billion years ago, turns out not to cause serious problems for their evolution of life.

Two geophysicists, Kasting and Caldeira, pointed out just how important a role plate tectonics and volcanism play in habitability. As a star becomes brighter with age, its habitable zone moves outward. Plate tectonics and volcanism keep a planet habitable for longer. Independent of life forms, rocks weather by absorbing CO_2 , while volcanoes and ocean ridges from plate tectonics release that CO_2 again. As a planet becomes warmer, its rocks also become warmer, absorbing more CO_2 as they weather faster. With less CO_2 in its atmosphere, it can remain at the same temperature despite the warming of its sun. Any absorbed CO_2 eventually returns to their atmosphere by volcanoes. While this feedback cycle goes on, the planet resists any loss of habitability due to changes in its star's habitable zone. This feedback system with CO_2 plays a big role in keeping a planet habitable as its sun grows brighter. However if CO_2 becomes too low, photosynthesis becomes impossible and complex life dies out on the formerly habitable planet. To add to this, without plate tectonics or volcanism, the land mass on a planet will slowly wear down into its ocean.

Put briefly, geophysicists found that for M and G type stars habitability of a planet depends not on the time its star spends on the main sequence but on its level of internal radioactive elements. Except for F type stars, the time this CO_2 feedback allows a planet to remain habitable comes to less than the time its sun stays on the main sequence. ^{235}U decays the fastest and therefore produces the

most heat. With the half-life of ^{235}U (0.738 billion years), Earth will retain its habitability (with no human intervention) for only the next 0.9 to 1.5 billion years. This happens even though the Sun itself will stay on the main sequence for (about) the next five billion years. However planets born 8 billion years ago, with more of the four radioactives, will keep their volcanism and plate tectonics for 1.6 billion years longer than the Earth. However (again with no intervention), given that such planets were five billion years older than Earth by now they would have lost their heat and look much like any other early planet which began with the same level of ^{235}U as the Earth. Given the lower metallicity of their sun, they might well also be less massive than the Earth and so might even have lost their atmosphere except for a thin N_2 . Even longer-lived stars, such as K0-type stars, will last for four billion years longer than the Sun, but any Earthlike planets they may have will wear down as fast as the Earth. Unlike the Earth, however, they would do so without leaving their star's habitable zone. Mars and Venus began young; these planets would lose their habitability because they've grown old.

When we put all this together, including the geophysical insights, we still have many planets on which intelligent life might have formed as much as four billion years before we evolved on the Earth. Various people have argued that intelligent species for one or another reason will not spread throughout the galaxy. To this Lineweaver has said: "A billion years is a long, long time."

Could Special Circumstances Make Planets Habitable?

Various astronomers have come up with special circumstances which allow habitability outside the limits given above.

First, astronomers have found that

habitable orbits can exist around double stars, either binary stars quite close together or far enough apart. Can planets form in the proper orbits in the first place? Alan Hale points out that in at least one area of star formation, observations show dust disks around early binary stars (cf Beckwith 1990), at least for stars far enough apart. Such disks will have less mass than those around a single star, and may not form any Jupiters at all, much less hot Jupiters. Could significantly younger habitable planets than the Earth form in such a system? Fully 2/3 of all stars lie in binary or multiple systems. Earthlike planets may not have all been eaten by hot Jupiters.

Again, could hot Jupiters have moons big enough for habitability? Recall the novel *When Worlds Collide*, of an Earthlike world in orbit around a Jovian planet², which astronomers of the time universally thought based on a fantastic premise? Three authors, D.M. Williams, J.F. Kasting, and R.A. Wade, have now looked seriously at this possibility. If the hot Jupiter put out as much radiation as Jupiter, at a minimum such moons would have much thicker ozone layers than the Earth. Saturn shows the possibility of a hot Jupiter without the high radiation levels around Jupiter. Such a moon would also have a day-night cycle given not by its own rotation but by its motion around the larger planet. Still, sufficient atmosphere would allow enough wind that such long day-night cycles wouldn't freeze it. Again, depending on how far it orbited from its planet, fewer meteors would bombard it even though its planet attracted more. None of these problems gives an absolute barrier to habitability. Could we someday find such a planet?

Finally, it turns out that the Earth itself has its own peculiar circumstance: *our Moon*. The ratio of masses between the Moon and Earth is much larger than for any other planet in our solar system. The

²It is the Jovian planet which collides with Earth, not its Earthlike moon.

Moon restrains motion of the Earth's rotation axis. Studies of planet formation and behavior strongly suggest that otherwise Earthlike planets, lacking a Moon like Earth's, would have much more variable rotation axes. Theoretical calculations actually suggest that obliquity of such planets would vary much more, over times as short as 10 million years. D.M. Williams and others have looked at what might happen to the Earth at obliquities greater than its present 23.4° degrees, with the same continents and also with its continents centered at one pole or at the equator. (See Figure 5) "Habitable" in the sense of this paper asked for average temperatures between -10° C (14° F) and 40° C (104° F). Besides Earth's current obliquity, they looked at 55° obliquity and 85° obliquity (almost lying on its side, with its poles in line with its orbital plane). None of these obliquities or continental locations drove habitable area on the planet to zero, but particularly at 85° for a large polar continent it became quite small. Areas outside these regions became either arctic cold or more than tropically hot. Still, haven't life forms on Earth adapted to temperatures higher than 40° C? The problem with high obliquity comes not from its range of temperatures but from the frequent and sudden changes in obliquity: 10 million years doesn't give much time for an advanced life form to evolve to live in temperatures so different from those where it began. Primitive life forms such as bacteria, of course, can do exactly that, as we know from Earth's bacteria. For large and complex life forms, big changes in obliquity would have effects similar to what happened to the Earth at the end of the Cretaceous, 65 million years ago.

These authors did not deal with movement of continents due to plate tectonics. At one time Earth's continents

had all gathered together, just as in the examples above (though it also had the Moon). The authors did write a paper which included winds and CO₂ levels, both of which will increase the size of habitable regions even at 85°. Basically, this work suggests that our Moon makes the Earth a much more favorable location for the evolution of complex life than most other "habitable, Earthlike" planets.

And So, With The Best Ideas We Now Have, Could The Earth Be Unique?

Unfortunately, even though we can put much stronger limits than before on the number of planets as habitable as the Earth, we cannot bring those limits down so far that we can expect only *one* such planet in the galaxy. Moreover, even the time limits given by radioactive decay don't prevent evolution of another intelligent and technological species one billion years ago. All the limits given above hold only for life forms which cannot change their environment enough to avoid them. Fermi's question still remains unanswered, and with it the question of how we came to exist at all. However, it looks more and more likely that for whatever reason we are alone.

For what it's worth, I would say that its large Moon plays a large role in making Earth such a good home for the evolution of complex life. The geophysical work telling us the lifespan of habitability comes second: if it takes an average of more than six billion years to evolve a complex, intelligent, and technological life form³, then most once-habitable planets would have lost their heat. If planets all have only a standard, limited length of time to evolve complex life forms, then we may well have become the first intelligent and technological one, by chance alone. We'll still be just as

³For humans, monkeys appeared early after extinction of the dinosaurs, apes 25 million years ago. For a large fraction of the lifespan of the Earth itself (2.5 billion years versus 5 billion years) Earth may have had no life forms at all.

singular: the time between many dice all showing up a 1 doesn't become less if it has happened once.

So Finally: What Does Our Singularity Say About Our Future?

The first question our singularity raises is whether we want to terraform and live on other planets at all. The important thing here is that we're almost as unlikely to find many planets with complex life forms as we are to find those with intelligent life. If we choose this path, then virtually every terraformable world in the galaxy will someday provide a home for life forms which began here on Earth: not just human beings, but all of Earth's life forms, too: oak trees, alligators, robins, eagles, grasses, milkweed, hippos, and all the rest. Even over relatively short times, evolution can change life forms into new forms never seen before. All those terraformed planets will not have life identical to that of Earth, just descended from it. As for human life, we'll have many cultures too, if anything much quicker than evolution causes major changes in Earthly life forms. Among science fiction authors, Jack Vance comes closest (in some of his books) to imagining a future in which other cultures of human beings dominate.

To consider the possibilities, we can look at the ideas of James Oberg in *New Earths*. Oberg considers not only what might be involved in terraforming Mars, but also doing the same to Venus, the Jovian moon Io, and other bodies. If we go to a system with the aim of terraforming one or more of its planets or moons, then with our astronomy we'll know ahead of time just what we'll need to do such terraforming. But what do these astronomical discoveries say about terraformable planets?

First of all, planets younger than the Earth may be scarce, simply because they've been wiped out by the growth of hot Jupiters. Of the other 75% older than our own, many Earth-sized planets

once habitable will have lost their inner radioactivity and worn away. If such a planet has ceased to be habitable, then unlike Mars or Venus it may well still lie inside its star's habitable ring. (Stars grow brighter as they age). Oberg suggested tremendous mirrors to deflect some of the Sun's light from Venus. If outside their stars' habitable ring, we'd treat it similarly to Mars or Venus. It will need more water, too. In our solar system, sources of CO₂ and H₂O exist in abundance. For older solar systems some of these, such as comets, may have been exhausted. If such a system had a cold Jupiter, or even planets the size of Uranus or Neptune, then CO₂ and H₂O might be brought from them. Such planets would turn out even harder to terraform than Venus.

Planets like Mars, which may have never orbited within the Sun's habitable zone, would present similar problems to those of terraforming Mars. Given sources of CO₂ and H₂O, that should be possible. Again, we might find Earthlike planets covered with ocean; we might choose simply to live under that ocean. Otherwise we'd want to remove all the extra water, something taking significantly more energy than bringing water to a dry planet.

If we look at the distribution of matter in the galaxy, we find many more K, M, and N stars too small for habitable planets; brown dwarf stars; and planets drifting alone in interstellar space (some of them as large as Jupiter or larger, others much smaller: think of those planets thrown from their system by the growth of hot Jupiters). The range of systems allowing space habitats exceeds those with terraformable planets by several orders of magnitude. Besides K, M, and N type stars, we have stars outside the habitable ring. Size of planets ceases to matter at all. Except for stars of type A, B, or O, the spectral type of a star will not matter. Even O-type stars might have habitats orbiting them, for those who want to study them closely during their

short lives. Areas inside the habitable ring might have habitats designed to resist nearby supernovas, and able to move back to their former position if tides from nearby stars disturb their orbits. We only need matter of the proper kind to make space habitats.

Whether or not some people choose to terraform whatever planets they can, one kind of civilization may well dominate: one which is entirely space-based, whose people do not live on planets nor ever dream of doing so. Space habitats would hold most of the human race. Nor would such habitats lack their own life forms, descended from Earth's just like their human inhabitants. Special habitats might even be built to provide homes for animals which would otherwise go extinct, such as whales. Those living in such habitats would live amid gardens, not steel. Nor can we expect these people to be any less variable than those living on planets. Groups of habitats might have their own cultures, just as we see on Earth.

So far as I know, no science fiction author has seriously presented such a society. Varley has a space-based human civilization, but only because humans were thrown off the Earth by other hyperadvanced creatures, who decided that Earth should become a habitat for whales. Cherryh has hints of such a civilization, but living in ships moving between the stars or space stations around (usually) habitable planets.

In the end, though, most humans may well live in space habitats rather than on planets. Would they even care if a planet were habitable? They might keep some such systems, found before planetary humans found them, as museums, and take most of them apart for their materials. And the Earth, the source of all this complex life, might someday become a museum. ■

SOME REFERENCES:

With the discovery of hot Jupiters, questions involving habitability of plan-

ets of other stars have once more become current. Below are most of the references given in this article, with some comments. *Icarus* is a particularly good journal for discussion of these issues. Another book, the proceedings of a conference, *Circumstellar Habitable Zones*, Proc. 1st International Conf, LR Doyle (ed.), Travis House Publications, Menlo Park, CA 1996, contains several papers and ideas to which I refer in this article, and is worth a look.

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Seventy-Five Years

Michael A. Burstein

As times change, so do laws—in many
interconnected ways.
And 75 years is enough. . . .

Isabel paused at the entrance of the Hart Senate Office Building. She turned southwest for a moment to take one last look at the shell of the Capitol Building. A rare Columbia District snowfall obscured her view slightly, but she could still make out the scaffolding surrounding the dome. They were saying that it wouldn't be rebuilt until the summer, half a year or so away.

She turned around, loosened her coat, and walked through the main entrance of the Hart Building. She showed her special visitor's badge to the security guards, hearing the telltale hum as she passed through the one thin electronic railgate that scanned her body and briefcase. When she failed to set off any alarms, one of the guards nodded to her, and she stepped into the main atrium of the building.

She walked quickly past the Alexander Calder sculpture "Mountains and Clouds" that filled the cavernous atrium. The black aluminum sheets of the sus-

pended "clouds" and the standing "mountains" contrasted with the white marble of the floor and walls. Many times before, Isabel had appreciated the majestic feeling the sculpture gave to the atrium. But not today. Today she had to focus on her mission, and she couldn't afford any distractions.

She entered an empty elevator, which whisked her up to the seventh floor, where Peter had his office. Not Peter, she thought. Not even Fitz. Think of him as Senator Fitzgerald. Maintain a proper level of detachment. Approach him first as a historian, not as an ex-wife.

The elevator opened, and her feet remembered the way. She felt as if she was watching her body from outside as she glided to Peter's office.

She pushed the button next to the door, and within a moment she was buzzed into the outer office. The place looked sparse. A calendar on the wall displayed today's date: Thursday, February 27, 2098.

The senator's chief of staff, James MacDonald Wills, nodded at her from behind his desk as she slid into the outer office. His blue blazer clung tightly to his slight frame.

"Hi, Jim."

"Hi, Isabel," he said, still staring at whatever images his glasses were displaying. "Give me a moment to kill the feed."

She nodded. He pushed a button on his earpiece, and his eyes focused onto her.

"What was it?"

"Nothing important." He smiled, and she understood. Whatever he had been studying was not for public consumption.

She inclined her head towards the door. "How's the old man?"

Jim shrugged. "Same as always, I suppose. He's expecting you."

"Can I go in, then?"

Jim nodded. "Sure. Although I'd love to know what this is all about."

She looked back at Jim. "He hasn't told you?"

"Nary a peep."

She nodded. "Well, I'm sure he'll tell you eventually." She took a deep breath and pushed open the door.

Isabel had not been in Peter's office since the divorce, so many years ago. She recalled that it had always been a maelstrom of chaos, with handhelds, pads, and even actual papers scattered all over his desk and his chairs. So she was surprised to discover Peter sitting behind an oak desk with an uncluttered surface, upon which sat only a cup and a terminal.

She was even more surprised when she looked at Peter.

Peter's hair had long ago turned gray, and in response he had undergone depilation. His head, once covered in dark, thick hair, was now bald. She also remembered his wrinkled face, and its current smoothness advertised the benefits of the rejuvenation therapies medical

science had developed within the last ten years. Isabel had last seen Peter up close ten years ago, but today he looked not ten years older, but many more years younger.

"Hello, Senator," she said.

"Hello, Isabel. It's been a long time, but you can still call me Peter." He inclined his head, and a chair slid towards Isabel. As she settled herself into it, he reached for his cup and took a sip.

"Comfortable?" he asked.

"Yes."

"Good. I'm glad you wanted to come see me."

"That's crap, and you know it," she replied after only a moment's hesitation.

Peter paused with the cup halfway back to the desk. "Pardon me?"

"Peter, cut the geniality for the moment. I know as well as you do how much pull it took for me to arrange this meeting."

He put the cup back down and shrugged. "You haven't changed, Isabel. You're still as blunt as ever." He rubbed his eyes. "Fine. I resent this meeting and I have no interest in talking to you. Are you going to do me the favor of leaving now?"

"No, I'm not. I'm going to have my say."

He smiled. "Have your say, then. It's not going to change anything."

"Very well. I'm here to ask you to leave Title 13 of the United States Code alone."

He sighed. "Tell me something I don't know."

"I doubt I'll be able to, Peter. But maybe I can give you a different perspective on it."

"A different perspective? On my Census bill?"

Isabel opened up her briefcase and removed one of her handhelds. "I have here the text of your bill, and the argument you've given in favor of it."

"Mrrph."

Isabel turned the handheld on and read to herself briefly. "According to this,

ANALOG

your bill would push the date of release of the individual Census forms from seventy-two to seventy-five years."

"It makes sense, Isabel."

"It does?"

He pointed to her handheld. "You say you have my argument in there."

"I do. And I find it specious."

"Oh, really?"

She nodded. "You're very clever, the way you're hiding this change as a way to save money for both the federal government and the taxpayers."

"Well, it does save money. With more time to process the individual Census reports, the less we'll have to pay overall. And who cares if we delay the release of the individual questionnaires from 2030? It's not like there are a ton of people dying to see them."

"But there are. I represent a coalition of historians—"

"That wasn't a joke?"

"No, it's not a joke."

"Look, historians have always waited seventy-two years for the individual questionnaires to be released. And they have the statistical data; hell, they've had it since the Census was taken. This is such a minor thing; I have no idea why you're so upset about it."

"Then let me tell you. Suppose you do push the release date to seventy-five years. And the world doesn't come to an end."

"So?"

"So a precedent is set. A few years later, someone else suggests that we push it to eighty years, then ninety, then one hundred. Before you know it, Census data is kept confidential in perpetuity and history is lost. And all because you managed to push the date of release to seventy-five years."

Peter stared at her for a moment, then let loose with a raucous guffaw. "History is lost? You're kidding, right?"

"No, I'm not. It's like the great copyright battles of the early twenty-first century. When all the corporations fought for copyright extensions so they could

hold onto the rights to their characters so that no one else could ever use them."

"So Time-Warner-Marvel-Disney still owns Mickey Mouse, Superman, and Spider-Man. So what?"

"So our cultural heritage is taken away from the public and reserved for the corporations. Now it's our historical identity that you're threatening to rob with your new bill."

"Isabel, it's not just the money."

"Right. It's also the longevity factor."

Peter looked surprised, but nodded. "People live longer today. Our founding fathers lived in a world in which the average lifespan was barely forty years. They couldn't fathom a world in which people routinely lived to be three times that age. But here we are today, and there are millions of people alive right now who filled out that Census back in 2030. Releasing the information too soon would be a violation of their privacy. History must be subservient to the living."

She shook her head slowly. "You don't really believe that, Peter. I know you too well. Perhaps you think that history ought to be subservient to you, but not to the rest of us."

"So what if I do? The argument still holds."

She sighed. "Peter, you're forcing my hand. And I really don't think you want to do that."

He leaned back in his chair and gave Isabel a small smile. "Oh, why not? Amuse me. What else have you got?"

Isabel took a deep breath and considered her words carefully before she spoke. "Very well. Peter, according to your birth certificate, you've just turned 68 years old this month. And the significance of your age is not lost on me. You're in the 2030 census. It's not others you're trying to protect; it's yourself."

Time seemed to stand still for Isabel. She had not wanted to bring up her trump card, but here it was. And Peter

sat there, quiet and unmoving, his face unreadable.

Isabel counted off thirty seconds in her head before she found the courage to break the silence. "Peter?"

"Senator," he replied.

She nodded. "Senator Fitzgerald. Will you agree to drop the bill? Or should I—"

Peter cut her off. "No. Go on. I want to hear what you have to say."

"Okay. Let me start from basics, then. If Title 13 stays the same, the 2030 census data will be released in 2102. But if your law gets passed, it doesn't get released until 2105."

"So?"

"You're planning to run for president in 2104, aren't you?"

He glared at her. "The media's speculations—"

"Screw the media, Senator. I'm not about to head out your office door and go blogging on the Holosites. For the moment, this is just you and me in your office. So are you running for president in 2104?"

"I'm running for re-election *now*, Isabel. In case you had forgotten, my current term as senator expires this year. And the voters of Massachusetts either support the idea of pushing the Census release ahead by three years, or they don't care. And given the demographics of the rest of the country—"

"I know the demographics of the country. Over forty percent of the population is over sixty-five. If you bother to present the longevity argument to them, they may very well support the bill. But think for a moment. I'm not the only one who's going to be able to make this connection. It's obvious that if Title 13 is changed, your personal first Census record will stay hidden until after the election of 2104.

"So what's in the census of 2030 that *you* want to hide?"

Peter sighed. "I always said you were smarter than I was, Isabel. Why didn't you go into politics?"

"I preferred teaching history at Har-

vard."

"Yes, you did. Well, I didn't tell you my secret when we were married; what makes you think I'll tell you now?"

"Because I wanted to give you the chance to do so before I told it to you."

For the first time that she could recall, Isabel saw fear on Peter's face. He tried to cover it up with a sneer, but Isabel could see right through him.

"Oh, really?" he asked. "You think you know what I'm hiding?"

"Yes. I did some digging of my own." She reached into her briefcase and pulled out another handheld. "The United States went through a bizarre period at the turn of the millennium. We were polarized between the liberal states and the conservative states, kind of like we are today. Even the war on terror couldn't unite the country for more than a brief period of time. And our state, Massachusetts, has always been among the most radical. Lexington and Concord. The only state not to vote for Nixon. Same-sex marriage from 2004 to 2044. Polygamy approved under the second Mormon governor."

She paused. "And, thanks to MIT and Harvard, legal human cloning for a very brief window in the 2020s."

Peter coughed. "That has nothing to do with me."

"Not according to your birth certificate, no. But birth certificates never revealed that information. The Census, on the other hand, added a question in April of 2030, because of the legality of cloning."

Isabel studied Peter's face; the fear was gone.

"Isabel—" he began.

"There's no record of your mother, Peter."

"She died in childbirth."

"That's what you always told me before. But that's not what I found." She paused. "You're a clone of your father, Peter. Or rather, of one of them. And I have proof."

Peter remained quiet, so Isabel

pressed on. "Before 2004, your biological father would have been what was euphemistically referred to as a confirmed bachelor. But according to records in Brookline Town Hall, your father was married to another man when you were born. Of course, in this day and age no one may care about that, especially since your fathers divorced shortly after you were born.

"But they will care about the fact that you're a clone."

Peter bit his lip. "I'm just as much a human being as anyone else."

"Of course you are, Peter. I don't deny it. But there are people out there who will claim that you're not, that you lack a soul, or that you're a demon. Insufferable bigots, all of them. But unfortunately for you, there's still a stigma."

"Are you going to reveal this?"

"Only if you make me. The way I see it, Peter, if you pull back from your position on Title 13, you have a chance that no one will find out your secret. After all, there's a lot of Census data to go through. On the other hand, since you've been so vocal about pushing the release date to seventy-five years, your opponents might very well do some extensive digging before the election. But that's a chance you've got to take. Because if you don't back off, I'm releasing what I know to the press. And your secret will definitely be out."

He wrung his hands. "It was never about protecting history with you at all, Isabel. You just wanted to ruin me."

"Partly," she admitted. "I hated the way politics tore us apart. But I'd rather not ruin you if I don't have to. There is another way."

"What?"

"Be bold, for once in your life."

"What are you talking about?"

Isabel smiled. "Throughout our history, great men and women have stepped forward to stop discrimination. Rosa Parks. Martin Luther King. Margaret Marshall." She paused. "You can be one of them. Fight the good fight. Let the world

know that you're a clone before the Census data is released in 2102."

He shook his head. "I don't know. I'm not sure I have the strength for that kind of fight anymore."

"Then you shouldn't be in the Senate anymore, should you?" She paused. "You fought like this once before. You can do it again. Hell, don't wait until the presidential election of 2104. Announce it now, during your '98 re-election campaign."

"I'll lose my seat."

"So what? You'll gain a place in history, a far more important place than if you became president. I know you've always been obsessed with history, Peter. That's why I married you. Return the favor to history."

Peter sighed and pushed back away from his desk. He stood up, walked around Isabel, and stopped at his office window. He stood there quietly for a moment, then turned to face Isabel again. She could see a weary look in his eyes.

"Well?" she asked.

"I don't know if I can handle it," he said.

"I'm sure you can."

He closed the distance between them and took her hand, surprising her. "Perhaps I could," he said. "But only on one condition."

"You're naming conditions?"

"Yes." He paused. "Stay with me."

"I'm sorry?"

"I never should have let you go."

"Is this blackmail?"

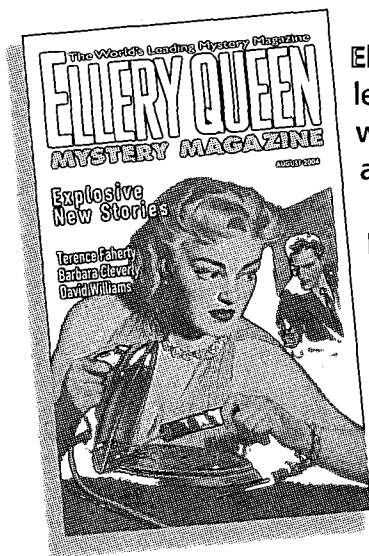
He sighed again. "No, no it's not. I'll do what you ask, whether or not you join me again. But you were always the stronger of the two of us. And this burden . . . it would be better shared."

She looked into his eyes, and for the first time in years, saw in his soul the man she remembered. Gently, she squeezed his hand, and felt him squeeze hers back.

"It would be," she said. ■

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Rough Draft

Kevin J. Anderson &
Rebecca Moesta

Inspiration can come from unexpected sources. . . .

After a decade during which he wrote and published nothing new, the fan letters dwindled to a few a year.

"Dear Mr. Coren, You're the best science fiction writer ever!"

"Dear Mr. Coren, Your book *Divergent Lines* changed my life. I felt as if you were speaking directly to me, and you helped me work through some major issues."

The entire experience, though great for the ego, had ultimately proved meaningless. Eventually he'd been forced to return the money for the second book advance, because he simply couldn't do it again. After enjoying a pleasant day in the sun, Mitchell Coren had retreated to his small apartment to live a normal life. The gleaming Nebula Award and the silver Hugo—both dusty now—were little more than knickknacks on the mantle of a fireplace that he never used.

Having convinced himself of the wisdom of J.D. Salinger's approach to authorial fame, Mitchell had squelched all thoughts of returning to writing. He immersed himself in a normal life with all its petty concerns.

Today, with an indifference born of long practice, Mitchell opened his bills and junk mail before finally tearing open the padded envelope that obviously con-

tained a book. Another intrusion, no doubt. An annoying reminder of his old life. He still received advance reading copies from editors trying to wheedle a rare cover quote from him, rough draft manuscripts from aspiring authors who begged for comments or critiques, and books presented to him by new authors who had been inspired by his lone published novel.

Inside this envelope, however, he found his own name on the dust jacket of a novel he had never written.

INFERNITIES

Mitchell Coren

Multiple Award-winning
Author of *Divergent Lines*

Whirling flakes of confusion compacted into a hard snowball in the pit of his stomach. "What the hell?"

His initial, and obvious, thought was that someone had stolen his name. But that didn't make sense. Though many editorial positions had changed in the decade since he'd published *Divergent Lines*, Mitchell was still well enough known in the insular science fiction community that somebody in the field would have noticed an imposter. Besides, how much could his byline be worth after all this time? It wasn't worth

stealing.

Someone had tucked a folded sheet of paper between the book's front cover and the endpaper. He read it warily.

DEAR MR. COREN,

AS A LONGTIME FAN OF YOURS, I THOUGHT YOU'D APPRECIATE SEEING THIS NOVEL I CAME ACROSS IN A PARALLEL UNIVERSE.

I'M A TIMELINE HUNTER BY PROFESSION. PERHAPS YOU'VE HEARD OF ALTERNITECH? OUR COMPANY USES A PROPRIETARY TECHNOLOGY TO OPEN GATEWAYS INTO ALTERNATE REALITIES. MY COLLEAGUES AND I EXPLORE THESE PARALLEL UNIVERSES FOR BREAKTHROUGHS OR USEFUL DISCREPANCIES THAT ALTERNITECH CAN PROFITABLY EXPLOIT: MEDICAL AND SCIENTIFIC ADVANCES, HISTORICAL DISCOVERIES, ARTISTIC VARIATIONS. MY SPECIALTY IS THE CREATIVE ARTS.

I STUMBLED UPON THIS BOOK IN AN ALTERNATE TIMELINE WHILE SEARCHING FOR A NEW MARIO PUZO. SINCE THE SCIENCE FICTION MARKET ISN'T NEARLY AS LARGE OR PROFITABLE AS THE MAINSTREAM, I COULDN'T SPEND MUCH TIME CHECKING OUT ITS BACKGROUND, BUT A BRIEF SEARCH SHOWED THAT THE 'ALTERNATE' MITCHELL COREN PUBLISHED A DOZEN OR SO SHORT STORIES AFTER *DIVERGENT LINES*, THEN PRODUCED THIS SECOND NOVEL. I'M HOPING ALTERNITECH WILL WANT TO ARRANGE FOR ITS PUBLICATION, BUT NATURALLY I FELT YOU SHOULD SEE IT FIRST.

WITH DEEPEST RESPECT,
JEREMY CARDIFF

Mitchell stared at the letter with mistrust and growing irritation. He had heard of this company that searched alternate realities for everything from new Beatles records, to evidence of UFOs or Kennedy assassination conspiracies, to cures for obscure diseases. He could understand the more humanitarian objectives, but why *fiction*? What gave Alternitech the right to infringe on his life like this?

He opened to the dust jacket photo and saw that the picture did resemble him, though this other Mitchell Coren wore a different hairstyle and a cocky,

self-assured grin. The bio mentioned that after completing *Infernities* he was "already at work on his next novel."

Oddly unsettled, Mitchell pushed the book away. Its very existence raised too many disturbing questions.

Three increasingly urgent phone calls to his former agent went unreturned. Since Mitchell had neither delivered anything new nor generated much income, his agent wasn't in a great hurry to attend to his so-called emergency. Even in the days when he'd briefly been a hot client, Mitchell had been relatively high-maintenance, needing encouragement and constant contact.

He decided to contact his entertainment attorney instead. After all, Sheldon Freiburg charged by the hour and therefore had an incentive to get right on the matter.

"Mitch Coren! I haven't heard from you since the last ice age." Freiburg's voice was bluff and hearty on the telephone. "What on earth have you been doing? You dropped off the map."

"I've been working a real-world job, Sheldon. You know, regular paycheck, benefits ... security?"

"Yeah, I've heard of those. Hopped off the old fame-and-fortune bandwagon, eh?"

"A modicum of fame, not a whole lot of fortune—as you well know."

Freiburg had handled the entertainment contracts for the two movie options on *Divergent Lines*. Mitchell had been young and naïve then, believing the Hollywood hype and enthusiasm. He'd been surrounded by smiling fast-talkers whose eager assertions of certain box-office appeal and guaranteed studio support were built on a foundation as strong as a soap bubble. After the attorney's fees and the agent's commission, the option money had been just enough to pay off his car, which was now ten years old.

"So, Mitchell," Freiburg said now, "people don't call me unless they have a situ-

ation—either good or bad—so let's hear it."

"Someone's trying to publish an unauthorized Mitchell Coren novel."

"You've actually done other work?" The lawyer sounded surprised. "Something new? I thought you'd turned hermit on us. Did somebody steal your manuscript?"

"This is trickier than that. It isn't exactly a matter of stealing. This is a novel from a parallel universe, and Alternitech wants to get it published here." He explained the situation in full.

"Oh, that *is* tricky—but not unheard of. Listen, since it's Tuesday, I'll give you a special deal, a quick and inexpensive answer."

"Inexpensive? You've changed in the last ten years, Sheldon."

The lawyer chuckled. "How could I help it? The whole world has changed. But you're not going to like what I have to say."

Mitchell braced himself, clutching the receiver; thankfully, Freiburg could not see his tense expression.

"Precedents have been set in this area. In every dispute about the use of materials from alternate universes, Alternitech has come out the winner. I'm convinced the company spends as much money each year on their team of lawyers as they did developing their parallel universe gateway. You'd be wasting your money to try and block the publication. Compared to the rest of the entertainment industry, authors and books are minnows in an ocean. Even the big fish in the music and film industries haven't won a single case.

"Alternitech's timeline hunters bring back intellectual property that might conceivably belong to a counterpart in this universe. The first big case was when one of their music specialists, a guy named Jeremy Cardiff—"

"That's who sent me the novel."

"Great," Freiburg said, then continued, ignoring the interruption. "In *Alternitech v. the Carpenter Estate*, Cardiff found

several new albums by the Carpenters, in an alternate reality where Karen Carpenter never died of anorexia. The CDs sounded like the same old shit to me, but don't underestimate the huge amount of money generated by piped-in background music. The Carpenter Estate sued, citing copyright infringement and unlawful exploitation of a creative work.

"Alternitech countered that since Karen Carpenter was dead in this universe, she could not 'create' new works after the date of her death. They also argued using an old favorite of the pharmaceutical companies, that since Alternitech had made such a substantial investment developing their technology, they deserved to reap the benefits of its commercial exploitation.

"The ruling sided with the Carpenter Estate insofar as establishing a 'fair percentage' of profits that should go to the creator's counterpart in this reality—15 percent, I think it was. But since Alternitech's timeline hunters did all the work to obtain the property, kind of like salvage hunters on the high seas, they were granted full control of its use. Similar lawsuits have been raised by individual movie producers, screenwriters, directors, and even actors who resent the release of 'new films' starring them for which they never got paid. Like I said, in every case, they lose."

Mitchell remembered that one of the alternate Mel Gibson films had caused something of a stir, because the parallel-universe version of the actor had received an Academy Award for a role that this timeline's Gibson had turned down.

Freiburg continued. "When you get right down to it, Mitch, record companies and movie studios don't *want* the individual artists to win. Alternitech provides them with completely finished new work for a fraction of the cost or effort of making it themselves. Much less hassle, too. They just distribute the work through their normal channels and pay a standard percentage of artist's royalties directly to Alternitech. Then, if and only

if the court orders it, Alternitech cuts a teeny weeny check to our own world's parallel artist or company or estate, and everyone is happy. Well, almost everyone."

"So you're saying I shouldn't even try, Sheldon? It's not . . . not *right!*"

"Mitch, if Paul McCartney can't win, then a mere sci-fi novelist doesn't stand a snowball's chance." He paused as if reconsidering. "On the other hand, Mitch my friend, I just thought of a factor that's ironically in your favor, if you really want to stop publication. There's a very real chance that Alternitech won't even bother with your little book. Look at your royalty statements. You're a science fiction writer ten years out of the public eye. Oh sure, there'd be a limited audience for a 'lost unpublished work' by Mitchell Coren . . . but it isn't exactly a Margaret Mitchell sequel to *Gone with the Wind*. If this Cardiff guy is a fan of yours, contact him and tell him how you feel. Who knows, he might do you a favor and pretend he never found it."

Mitchell didn't know whether to feel stung or take heart from the possibility.

Distracted and fretting, he polished the two awards on his mantel—something he hadn't done for the better part of a year. They looked quite impressive, he had to admit, and certainly gave him bragging rights. His occasional visitors asked about them, and he answered with feigned modesty. The awards seemed so irrelevant to his current life.

These days, Mitchell used his skills as a wordsmith in the unglamorous but stable profession of technical writing, producing essential documentation and annual reports for a manufacturing firm. Although it was a challenge to write compelling prose about new cereal box designs or recyclable plastic bottles, he was a master at slanting his text toward investors or consumers or environmental agencies, as needed.

Many of his coworkers—what the science fiction world called "mundanes"—

were aspiring writers who never managed to finish or submit stories. Few of them knew about his past, however, since Mitchell rarely mentioned his novel.

As he rubbed a fingerprint off the Nebula's clear Lucite surface, looking at the suspended bits of metal shavings and semiprecious stones that formed a sparkling galaxy, he thought back to those brief, heady days. They were just memories now, but he wouldn't trade them for anything.

Divergent Lines had appeared with a splash like a giant water balloon. An excerpt of the novel had been published in *Analog* as the cover story and won that month's readers' poll. The novel itself had generated rave reviews and was immediately dubbed "a new classic" by critics and his fellow SF authors.

He had been welcomed as a hero at the World Science Fiction Convention. He'd always read science fiction, but had never attended a con before. The fans surprised him at panels, listening to everything he said. They lined up for his book signings in the autograph hall or followed him and asked embarrassingly earnest questions about details he himself had never considered.

When Mitchell went to the Hugo Awards ceremony, he found himself plunged into a sea of unreality as the emcee announced his name as the winner. Astonished and grinning, he stumbled up to the podium and held up his silver rocket ship with mixed feelings of shock and giddy triumph.

The following spring, thanks to the continued buzz, *Divergent Lines* had been a shoe-in for the final Nebula ballot. New to the entire experience, Mitchell stood like a lost puppy in the lobby and the bar, surrounded by luminaries of the genre. He recognized their names from the covers of well-loved books, famous writers ranging from Grand Masters to prolific hacks, all of them legendary and, for the most part, *personable*.

He'd been in a daze. These Titans of

science fiction talked to him as a peer, praised his novel. Mitchell found it unnerving, and he began to wonder how he could ever live up to their expectations. Did he deserve so much praise and success? What if his next work didn't measure up to their expectations? Would he be exposed as a fraud and cast out of this distinguished circle of authors? How would he bear the humiliation?

His publisher paid for his Nebula banquet ticket, and Mitchell was treated as a celebrity at their table. With his stomach tied in knots, he could summon no appetite at all. In an agony of anticipation, he endured the drawn-out meal, the mandatory chit-chat, the interminable banquet speaker. By the time the awards finally began, plodding through each category as if in a calculated effort to increase his anxiety, Mitchell had convinced himself that he had no chance of winning. He was a newcomer. He had no track record. He had never played the politics of exchanging recommendations. He had not campaigned for the award. These writers couldn't possibly consider him a friend and certainly didn't owe him any favors.

And yet the name in the presenter's envelope said *Divergent Lines*. The Nebula seemed even more amazing than the Hugo, because this honor came from his peers, fellow professionals who supposedly knew good writing when they saw it. As Mitchell stood clutching the award, he imagined that someday, when he stood at the Pearly Gates and looked back on his entire life, this would be the high point. . . .

After that night, though, Mitchell Coren never wrote another word of fiction. He had left the science fiction community behind and let *Divergent Lines* stand as his sole legacy.

Even in his heyday, Mitchell had not spent much time with diehard science fiction fans. Not because he didn't like them—he appreciated anyone who

bought and loved his novel. But he didn't understand their intensity or their passions and usually ended up feeling outclassed when they wanted to talk shop.

He met Jeremy Cardiff at a quiet place called Mrs. Coffee, a small bistro with shaded outside tables where they could have a conversation in a pleasant atmosphere. Mitchell didn't know which of them was more nervous. He could see in the timeline hunter's eyes that Jeremy was a bona fide Fan.

"This is really an honor, Mr. Coren. I've always been an admirer of *Divergent Lines*, and now that I've read *Infernties*, there's no doubt in my mind that you're one of my all-time favorite authors. I felt so surprised and fortunate to have found the book." Jeremy, a youngish man with a thin face, long hair, and a neatly-trimmed brown beard, looked like a waif hoping for a pat on the head. His blue eyes were wide, his smile tentative.

Mitchell took a drink of coffee, then cleared his throat. "Well, Mr. Cardiff, that's what I'm here to talk to you about."

"Please, call me Jeremy." Then the younger man's face fell as he interpreted Mitchell's reluctant tone. . . .

Mitchell chose his words as carefully as he would have in preparing a view-graph presentation for the board of the manufacturing company. He wasn't sure his reasons would make sense to anyone but himself. Though he knew he didn't exactly have a legal case, he might be able to play the celebrity card. Perhaps by asking a special favor from his number one fan, he could get what he needed. "I think you're perceptive enough to understand why I don't want the novel published here. It's not *my* book. Somebody else wrote it."

"No, Mr. Coren. You wrote it. Another version of you, maybe, but it was still your talent, your creativity. When I was in college I read and reread *Divergent Lines* until my copy fell apart, and I've been waiting ten years for a new novel by the same author. When I found *Infer-*

nities, I sent you the physical book I brought back through the portal, but I made a photocopy. I'm already on my second time through it. It's brilliant—full of intricate layers and nuances.”

Mitchell desperately wanted to ask which book he thought was better. Dedicated readers like Jeremy were generally his toughest customers and his harshest critics and, because Mitchell didn't think a new novel could ever live up to their expectations, he had decided not to try.

“That man may have the same name and the same genetics as I do, but he grew up in a parallel universe with a different set of circumstances. He's not me. He obviously reached a different decision about his career. But I didn't write *Infernities*, and if you published it here in our universe, people would see it as my own work, no matter how many disclaimers you put on it.”

“But it's good, sir. Have you read it?”

“No, I don't dare. It would seem almost . . . plagiaristic.”

As if clinging to hope, Jeremy said, “So . . . are you writing something of your own? Maybe a book that's similar to *Infernities*?”

“No. I'm not writing anything.”

The young man looked at his coffee as if it were poison. He didn't seem angry at Mitchell's attitude, just deeply disappointed. “Then I don't understand. What made you stop writing? I mean, you got the royal treatment. People were lined up waiting for your next book. You had a contract to fulfill, didn't you?”

“Yes. And I . . . decided to return the advance.”

“But why? It just doesn't make sense.”

“Why? I'd already won the highest accolades in my field.” Mitchell spoke softly, but his voice grew more intense. “Whether through brilliance or sheer dumb luck, I muddled my way to the pinnacle of success my first time out of the starting gate. *Divergent Lines* was hailed as the best book of the year, won all the awards, got spectacular reviews in

every periodical from *Publishers Weekly* and *Kirkus* to *Locus* and *Chronicle. Library Journal* called it an instant classic.”

Mitchell sighed. “Don't you see? The weight of it all gets oppressive. Where could I possibly go from there? There's no place but down.” An edge of bitterness sharpened his tone. “It's a very long way down. No matter how good it was, my second book—*Infernities* or whatever I might've called it—would never be good enough. The fans and the critics certainly aren't kind unless your sophomore effort is unbelievably spectacular.

“As it stands right now, I'll go down in history as the author of a great novel. But if I published twenty other books, regardless of how well-written they might be, I can tell you some of the review quotes already: ‘A solid novel, but not as inspired as *Divergent Lines*.’ Or ‘A fine effort, though it doesn't live up to the promise of its predecessor.’ Or, worse yet, ‘A disappointing follow-on to the author's first novel.’”

Jeremy frowned at what Mitchell was saying. “I think you're too hard on your fans, sir. We would have followed you. Even after ten years, most of us still want to read whatever you have to say.”

“Maybe I don't have anything else to say,” Mitchell said. “I can name author after author who falls into that category. Being successful is a catch-22. If your first novel is a smash hit, an award winner and a critical success, it might mean your career has momentum and you're launched. On the other hand, it could mean your writing will never be good enough again. What should I have done—expanded *Divergent Lines* and written a couple of unnecessary sequels, so I could call it a trilogy? I could have licensed my universe, farmed it out to other authors, but that just didn't seem right to me. Either way, I would have been crucified by the fans and the critics.”

“Just by the snobs,” Jeremy said, “not by the fans. But you disappeared from

fandom altogether. When's the last time you went to a science fiction convention?"

"The WorldCon where I got my Hugo was the first and last. I stopped reading *Locus* and *Chronicle* and *Ansible* after one of them ran an editorial about one-hit wonders that led off with 'What ever happened to Mitchell Coren?'" He looked at his coffee. "I didn't stand a chance of keeping up the momentum in my career. Fans and critics are too unpredictable. So I controlled the only part of the equation that I *could* control: I stopped writing fiction. My life is stable now that I've accepted the wisdom of anonymity. But if Alternitech publishes this apocryphal second novel that I didn't really write, then I'll be at the mercy of the public's expectations again. Please, don't do it."

Disappointment and resignation filled Jeremy's eyes as he unzipped his backpack and reached inside to withdraw a thick stack of photocopied pages. "Look, this is my only copy. What happens to it is not really supposed to be my decision. Alternitech owns proprietary rights to whatever I bring back from parallel universes. Still, no matter how much I loved this novel, I have to admit that this doesn't have the equivalent value to Alternitech of, say, an unknown collection of Sherlock Holmes stories by Arthur Conan Doyle or the Dean Koontz/Stephen King collaboration I uncovered once. I think people deserve to read it. I was going to have you autograph this for me." Jeremy slid the stack of papers across the table. "But now I guess you'd better keep it, so you'll know there aren't any other copies in existence. You decide what to do. It's your call, Mr. Coren. It's your book."

"I—" Mitchell started to speak, but found his voice choked with emotion. He took a long drink of his now-tepid coffee and started again. "Well . . . don't you want to keep it? You said you were reading it."

Jeremy shook his head. "If you knew I

had a copy, you'd always worry that someday I'd be tempted to post it on the Internet. It's better if you keep it."

The papers felt warm in Mitchell's hands. His vision blurred, and he took a moment to compose himself. "I . . . didn't expect this."

"I'm a musician myself, Mr. Coren. I write and record songs, but I haven't had much success so far. It was a minor consolation when I found that I did have a hit record in an alternate universe, but nothing here yet. I was the one who brought back the new music for that whole Karen Carpenter debacle, and I don't feel very good about it. As a musician, I thought Carpenter or her estate should have had some control over her own creative work, no matter which incarnation made the album. The same goes for you, sir. If you're uncomfortable about having *Infernities* published, then . . ." He shrugged.

"I can't tell you how much this means to me."

"I think I understand." Jeremy slurped his decaf cappuccino. "Besides, I'm your fan. I can't think of anything cooler than to know I am the only person in this entire universe who's read your new novel."

Dozens of the loose photocopy sheets wadded up under the fireplace grate made for good kindling. Mitchell rolled the remaining loose pages of twenty-pound bond into plump literary logs, rubber-banded them, and set them on the log holder above the crumpled pages. Then he fanned out the hardcover book and flattened it across the white paper logs. He stood back to observe the diminutive funeral pyre with a sense of uneasiness.

He should have felt relieved.

This potential source of humiliation or disruption would soon be dealt with. The book would no longer be in his life, could no longer irritate or goad him by its very existence. No fans would have a chance to either criticize or clamor for

more. The chapter would be closed.

Yes, Mitchell was definitely relieved.

After he lit the match, he hesitated for a long, indecisive moment before finally touching the flame to the edge of one of the loose sheets. There. A burnt offering to a cruel muse.

As the fire caught, guilt gnawed at the ragged edges of his mind. There was something intrinsically criminal about burning a book, especially the only copies of a book. While this event would not go down in history with the sacking of the Library of Alexandria, it was still a loss to at least some tiny backwater of the literary world—especially to the hopeful fans who had waited so long for any work by Mitchell Coren.

The flames grew higher, devouring the loose pages and curling the glossy dust jacket of *Infernities*. An interesting play on words, he thought. Infinity, Alternative, and Eternity all rolled together. Now he could add “Inferno” to make a quadruple entendre. He wondered how it related to the story.

Didn’t he owe it to himself at least to read his own work, to see what he could have done with his talent? *Infernities* was tangible proof that in some other reality his author-self had overcome the pressure and the expectations. But how? Didn’t that mean that he, too, could do it?

No. He’d made the right decision. He thought with some satisfaction of the author photo blackening and blistering, cremating his cocksure successful doppelganger. The man had dared to risk his reputation, his spotless literary legacy, to write this second novel and offer it to an unpredictable reading public. He had dared. Had risked ...

With a groan of annoyance and frustration Mitchell snatched the hardcover from the fire, dropped it to the floor, and stamped on it to put out the flames at the edges. He bent and reached for the singed novel that had disrupted his calm life.

As he picked up the blackened book,

Mitchell’s lips flickered in a smile. Though he still had no intention of publishing the novel, he would hold onto the book as a goad. Just to keep him honest. To remind himself of what could be.

He had his own ideas for new stories and novels, of course. Every writer did. The ideas had never stopped coming, and he had jotted down notes during lunch hours at his tech-writing job. Some of the outlines were damn good, but he had been too afraid of failure to write the books, believing it better to let readers live with his mysterious seclusion than to risk them shaking their heads in disappointment.

Yet his alternate self had somehow shaken off the fear of failure. Therefore, it could be done. And that sincere, appreciative look he had seen in Jeremy Cardiff’s eyes told Mitchell he still had an audience, no matter how small....

Some authors were motivated to write strictly for the critics, for the kudos and awards. Others wanted the money and name recognition of sales, with big print runs and splashy publicity. Some wrote only for themselves, giving the finger to anyone else’s expectations. But why had *he* become a writer?

Now there was a group to whom he owed something: his fans—the readers who understood what he was trying to do and who saw him as a human being with a talent that should not simply be thrown away. *Those* fans would enjoy whatever he wrote.

Certainly, a few of them went to the crazy fringe, seeing him as a guru with unparalleled insight into their particular problems. But most were just regular people. If he struck the right note, his pool of fans would be large; if he chose a path that was too esoteric, the numbers might dwindle. In either case, the readers still deserved his respect.

Mitchell looked at the charred copy of *Infernities* he held. He realized now that burning the novel was selfish. There were thousands (or maybe only dozens)

ANALOG

of people like Jeremy Cardiff, who would have enjoyed this book if he allowed it to be published.

Setting the burned hardcover down, he opened the bottom file drawer of his desk where he kept the folder of notes and ideas that were just too good to throw away. If he was going to bury this cuckoo's egg of a book, then he was obligated to give the readers something in exchange.

Mitchell skimmed his outlines. He had forgotten how clever or thought-provoking many of them were. Had he intended to be an Emily Dickinson, locking his notes away in a box for someone else to find after he died? Not long ago, he had been tempted to burn these, too.

Now he would write some of them.

As he flipped through his notes, the ideas reached a critical mass, and Mitchell saw how he could combine concepts and characters. What might have been simple short story ideas now became enough material for a multi-layered novel. It wouldn't be just like *Divergent Lines*, but so what? It would still be good, still be worth writing.

He spread the papers out on his desk. He had an old, outdated laptop computer and plenty of time during his lunch hours. Some of the greatest works of literature had been completed a few pages

at a time during lunch breaks. . .

Mitchell glanced at the fireplace, where the fire had already died to a pile of orange embers. The photocopied novel was now nothing but ash.

On the mantel above, his Hugo and Nebula awards reflected the dull glow. He turned away from them and focused on his desk. *Divergent Lines* had been an unnecessary ball-and-chain to his creativity, along with all the other excuses he had made up over the past ten years. That was enough procrastination.

He looked at the charred but still readable hardcover of *Infernties*. First, before he started on any new book or short story, he had to write a letter.

"Dear Mr. Cardiff, let me make you a bargain." He proposed that if he had not produced any new novels or short stories in the next five years, then Jeremy had his blessing to publish *Infernties*, if only to reward the fans who had waited so long. He packaged the letter with the scorched book and mailed it to his "number one fan." Simply knowing the novel existed would be all the inspiration he really needed.

On the way back from the mailbox, he smiled to himself, convinced it would never be necessary for the other Mitchell Coren's book to be published here. He would take that risk for himself. ■

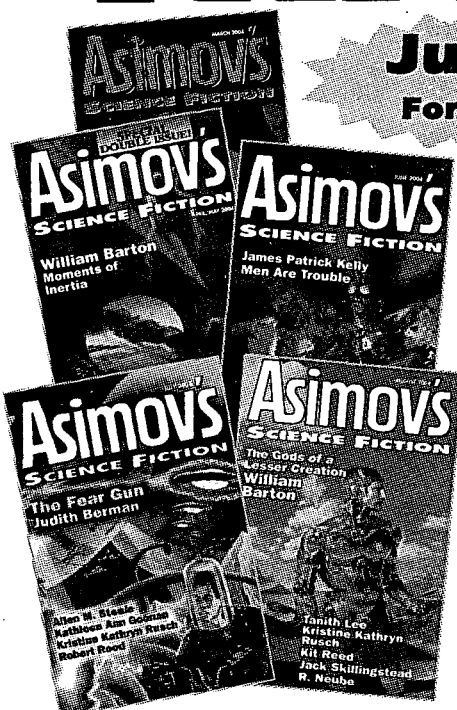
Nobody ever prevented a war by firing the first shot.

—Kelvin Throop

A law is valuable not because it is law, but because there is right in it.

—Henry Ward Beecher

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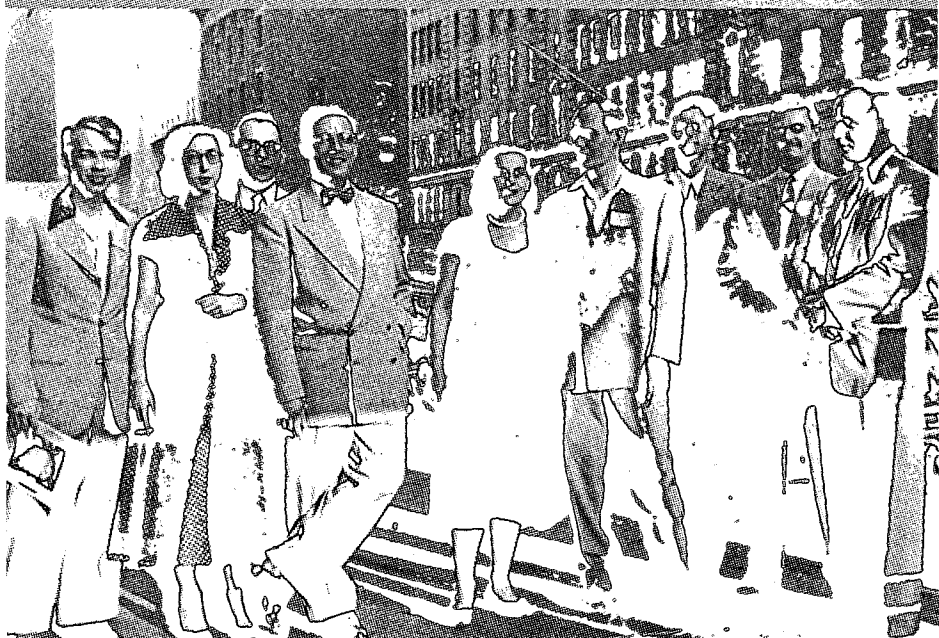
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84C-NN5VL1

The Analog/Astounding Photo Yearbook

Jay Kay Klein

A look back at some of *Analog/Astounding* 's friends and family through the years. All photos by author.



(L to R) Lester Del Rey, Evelyn Harrison, Harry Harrison, Isaac Asimov, Judy Merrill, Fred Pohl, Poul Anderson, L. Sprague De Camp, P. Schuyler Miller - c. 1950



Eric Frank Russell



A.E. Van Vogt

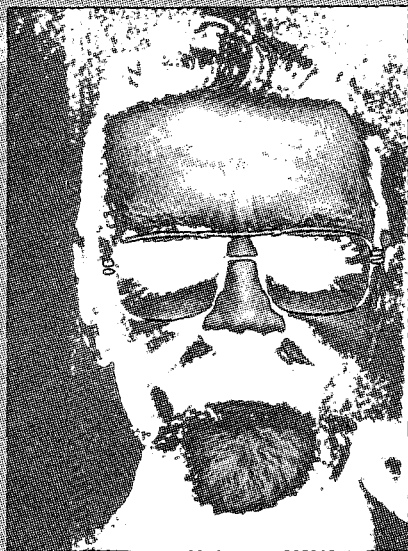


Vincent di Fate

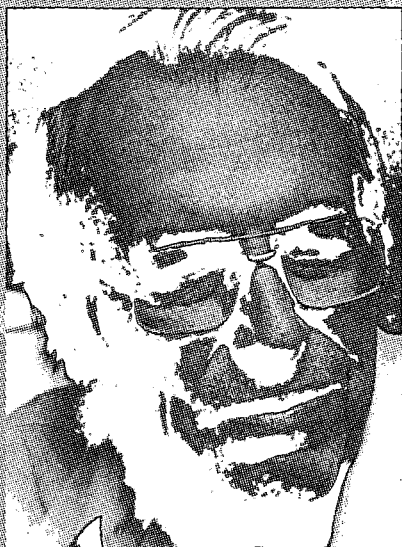


Kelly and Laura Freas (top),
Robert Forward (R)





L. Sprague de Camp



Jack Williamson



Orson Scott Card



Gordon Dickson (L),
Anne McCaffrey (below)





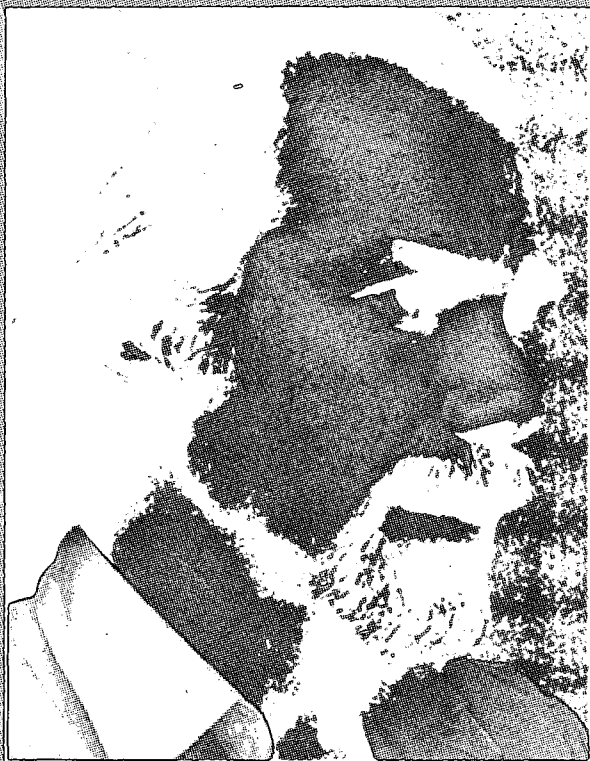
Ben Bova (L),
John W. Campbell (below)





George R.R. Martin (top),
Spider and Jeanne Robinson
(R)



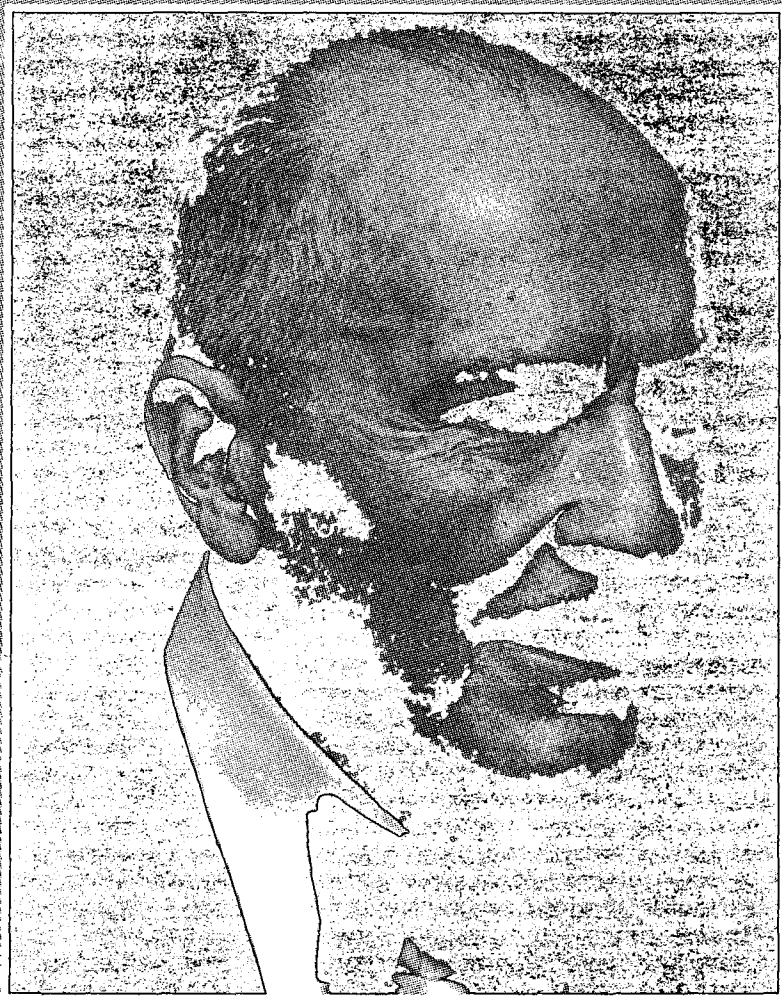


Robert Silverberg (top),
Joe Haldeman (R)



Murray Leinster (R),
C.L. Moore (below)





Robert A. Heinlein



(above, L to R) Theodore
Sturgeon, Fred Pohl, A. Bertram
Chandler, Norman Spinrad,
Alfred Bester - c. 1976



Jay Kay Klein

Engineering is a state of
mind, and the problems
it faces are only partly
technical.

The Supersonic Zeppelin

Ben Bova

Illustration by Josh Mathus

ENGINE
PROFILE
SSZ-001

11000 - 12000

11000 - 12000

ELECTRONIC REPRODUCTION PROHIBITED

S. S. Z

0579381

Mr. Jones

Mr. N. N. N.

Col M. Lane

Pr. Mr.

One by one

Mr. M.

Author's note: While this is a work of fiction, the concept of the Busemann biplane is real.

Let's see now. How did it all begin? A bunch of the boys were whooping it up in the Malamute Saloon—no, that's not right; actually it started in the cafeteria of the Anson Aerospace plant in Phoenix.

Okay, then, how about:

There are strange things done in the midnight sun by the men who moil for gold—well, yeah, but it was only a little after noon when Bob Wisdom plopped his loaded lunch tray on our table and sat down like a man disgusted with the universe. And anyway, engineers don't moil for gold; they're on salary.

I didn't like the way they all looked down on me, but I certainly didn't let it show. It wasn't just that I was the newbie among them: I wasn't even an engineer, just a recently graduated MBA assigned to work with the Advanced Planning Team, aptly acronymed APT. As far as they were concerned I was either a useless appendage forced on them, or a snoop from management sent to provide info on which of them should get laid off.

Actually, my assignment was to get these geniuses to come up with a project that we could sell to somebody, anybody. Otherwise, we'd all be hit by the iron ball when the next wave of layoffs started, just before Christmas.

Six shopping weeks left, I knew.

"What's with you, Bob?" Ray Kurtz asked. "You look like you spent the morning sniffing around a manure pile."

Wisdom was tall and lanky, with a round face that was normally cheerful, even in the face of Anson Aerospace's coming wave of cutbacks and layoffs. Today he looked dark and pouchy-eyed.

"Last night I watched a TV documentary about the old SST"

"The *Concorde*?" asked Kurtz. He wore a full bushy beard that made him look more like a dog-sled driver than a

metallurgical engineer.

"Yeah. They just towed the last one out to the Smithsonian on a barge. A beautiful hunk of flying machine like that riding to its final resting place on a converted garbage scow."

That's engineers for you. Our careers were hanging by a hair and he's upset over a piece of machinery.

"Beautiful, maybe," said Tommy Rohr. "But it was never a practical commercial airliner. It could never fly efficiently enough to be economically viable."

For an engineer, Rohr was unnervingly accurate in his economic analyses. He'd gotten out of the dot-com boom before it burst. Of the five of us at the lunch table, Tommy was the only one who wasn't worried about losing his job—he had a much more immediate worry: his new trophy wife and her credit cards.

"It's just a damned shame," Wisdom grumbled. "The end of an era."

Kurtz, our bushy-bearded metallurgist, shook his graying head. "The eco-nuts wouldn't let it fly supersonic over populated areas. That ruined its chances of being practical."

"The trouble is," Wisdom muttered as he unwrapped a soggy sandwich, "you can build a supersonic aircraft that doesn't produce a sonic boom."

"No sonic boom?" I asked. Like I said, I was the newcomer to the APT group.

Bob Wisdom smiled like a sphinx.

"What's the catch?" asked Richard Grand in his slightly Anglicized accent. He'd been born in the Bronx, but he'd won a Rhodes scholarship and came back trying to talk like Sir Stafford Cripps.

The cafeteria was only half filled, but there was still a fair amount of clattering and yammering going on all around us. Outside the picture window I could see it was raining cats and elephants, a real monsoon downpour. Something to do with global warming, I'd been told.

"Catch?" Bob echoed, trying to look hurt. "Why should there be a catch?"

"Because if someone could build a supersonic aircraft that didn't shatter one's eardrums with its sonic boom, old boy, obviously someone could have done it long before this."

"We could do it," Bob said pleasantly. Then he bit into his sandwich.

"Why aren't we, then?" Kurtz asked, his brows knitting.

Bob shrugged elaborately as he chewed on his ham and five-grain bread.

Rohr wagged a finger at him. "What do you know that we don't? Or is this a gag?"

Bob swallowed and replied, "It's just simple aerodynamics."

"What's the go of it?" Grand asked. He got that phrase from reading a biography of James Clerk Maxwell.

"Well," Bob said, putting down the limp remains of the sandwich, "there's a type of wing that a German aerodynamicist named Adolph Busemann invented back in the nineteen-twenties. It's a sort of biplane configuration, actually. The shock waves that cause a sonic boom are cancelled out between the two wings."

"No sonic boom?"

"No sonic boom. Instead of flat wings, like normal, you need to wrap the wings around the fuselage, make a ringwing."

"What's a ringwing?" innocent li'l me asked.

Bob pulled a felt-tip pen from his shirt pocket and began sketching on his paper placemat.

"Here's the fuselage of the plane." He drew a narrow cigar shape. "Now we wrap the wing around it, like a sleeve. See?" He drew what looked to me like a tube wrapped around the cigar. "Actually it's two wings, one inside the other, and all the shock waves that cause the sonic boom get cancelled out. No sonic boom."

The rest of us looked at Bob, then down at the sketch, then up at Bob again. Rohr looked wary, like he was waiting for the punch line. Kurtz looked like a puzzled Karl Marx.

"I don't know that much about aerodynamics," Rohr said slowly, "but this is a Busemann biplane you're talking about, isn't it?"

"That's right."

"Uh-huh. And isn't it true that a Busemann biplane's wings produce no lift?"

"That's right," Bob admitted, breaking into a grin.

"No lift?" Kurtz snapped.

"Zero lift."

"Then how the hell do you get it off the ground?"

"It won't fly, Orville," Bob Wisdom said, his grin widening. "That's why nobody's built one."

The rest of us groaned while Bob laughed at us. An engineer's joke, in the face of impending doom. We'd been had.

Until, that is, I blurted out, "So why don't you fill it with helium?"

The guys spent the next few days laughing at me and the idea of a supersonic zeppelin. I have to admit, at that stage of the game I thought it was kind of silly, too. But yet . . .

Richard Grand could be pompous, but he wasn't stupid. Before the week was out he just happened to pass by my phonebooth-sized cubicle and dropped in for a little chat, like the lord of the manor being gracious to a stable hand.

"That was rather clever of you, that supersonic zeppelin quip," he said as he unconcerned himself in a teeny wheeled chair he had to roll in from an empty cubicle.

"Thanks," I noncommittally, wondering why a senior engineer would give a compliment to a junior MBA.

"It might even be feasible," Grand mused. "Technically, that is."

I could see in his eyes the specter of Christmas-yet-to-come and the layoffs that were coming with it. If a senior guy like Grand was worried, I thought, I ought to be scared purple. Could I use the SSZ idea to move up Anson Aerospace's hierarchical ladder? The guys at the bottom were the first ones sched-

uled for layoffs, I knew. I badly needed some altitude, and even though it sounded kind of wild, the supersonic zeppelin was the only foothold I had to get up off the floor.

"Still," Grand went on, "it isn't likely that management would go for the concept. Pity, isn't it?"

I nodded agreement while my mind raced. If I could get management to take the SSZ seriously, I might save my job. Maybe even get a promotion. But I needed an engineer to propose the concept to management. Those suits upstairs wouldn't listen to a newly-minted MBA; most of them were former engineers themselves who'd climbed a notch or two up the organization.

Grand sat there in that squeaky little chair and philosophized about the plight of the aerospace industry in general and the bleak prospects for Anson Aerospace in particular.

"Not the best of times to approach management with a bold, innovative concept," he concluded.

Omigod, I thought. He's talked himself out of it! He was starting to get up and leave my cubicle.

"You know," I said, literally grabbing his sleeve, "Winston Churchill backed a lot of bold, innovative ideas, didn't he? Like, he pushed the development of tanks in World War I, even though he was in the navy, not the army."

Grand gave me a strange look.

"And radar, in World War II," I added.

"And the atomic bomb," Grand replied. "Very few people realize it was Sir Winston who started the atomic bomb work, long before the Yanks got into it."

The Yanks? I thought. This from a Jewish engineer from the Bronx High School for Science.

I sighed longingly. "If Churchill were here today, I bet he'd push the SSZ for all it's worth. He had the courage of his convictions, Churchill did."

Grand nodded, but said nothing and left me at my desk. The next morning,

though, he came to my cubicle and told me to follow him.

Glad to get away from my claustrophobic work station, I headed after him, asking, "Where are we going?"

"Upstairs."

Management territory!

"What for?"

"To broach the concept of the supersonic zeppelin," said Grand, sticking out his lower lip in imitation of Churchillian pugnaciousness.

"The SSZ? For real?"

"Listen, my boy, and learn. The way this industry works is this: you grab onto an idea and ride it for all it's worth. I've decided to hitch my wagon to the supersonic zeppelin, and you should too."

I should too? Hell, I thought of it first!

John Driver had a whole office to himself and a luscious, sweet-tempered executive assistant of Greek-Italian ancestry, with almond-shaped dark eyes and lustrous hair even darker. Her name was Lisa, and half the male employees of Anson Aerospace fantasized about her, including me.

Driver's desk was big enough to land a helicopter on, and he kept it immaculately clean, mainly because he seldom did anything except sit behind it and try to look important. Driver was head of several engineering sections, including APT. Like so many others in Anson, he had been promoted to his level of incompetency: a perfect example of the Peter Principle. Under his less-than-brilliant leadership APT had managed to avoid developing anything more advanced than a short-range drone aircraft that ran on ethanol. It didn't fly very well, but the ground crew used the corn-based fuel to make booze that would peel the paint off a wall just by breathing at it from fifteen feet away.

I let Grand do the talking, of course. And, equally of course, he made Driver think the SSZ was his idea instead of mine.

"A supersonic zeppelin?" Driver snapped, once Grand had outlined the

idea to him. "Ridiculous!"

Unperturbed by our boss' hostility to new ideas, Grand said smoothly, "Don't be too hasty to dismiss the concept. It may have considerable merit. At the very least I believe we could talk NASA or the Transportation Department into giving us some money to study the concept."

At the word "money" Driver's frown eased a little. Driver was lean-faced, with hard features and a gaze that he liked to think was piercing. He now subjected Grand to his piercingest stare.

"You have to spend money to make money in this business," he said, in his best *Forbes* magazine accent.

"I understand that," Grand replied stiffly. "But we are quite willing to put some of our own time into this—until we can obtain government funding."

"Your own time?" Driver queried.

We? I asked myself. And immediately answered myself, Damned right. This is *my* idea and I'm going to follow it to the top. Or bust.

"I really believe we may be onto something that can save this company," Grand was purring.

Driver drummed his manicured fingers on his vast desk. "All right, if you feel so strongly about it. Do it on your own time and come back to me when you've got something worth showing. Don't say a word to anyone else, understand? Just me."

"Right, Chief." I learned later that whenever Grand wanted to flatter Driver he called him Chief.

"Our own time" was aerospace industry jargon for bootlegging hours from legitimate projects. Engineers have to charge every hour they work against an ongoing contract, or else their time is paid by the company's overhead account. Anson's management—and the accounting department—was very definitely against spending any money out of the company's overhead account. So I became a master bootlegger, finding charge numbers for my APT engineers.

They accepted my bootlegging without a word of thanks, and complained when I couldn't find a valid charge number and they actually had to work on their own time, after regular hours.

For the next six weeks Wisdom, Rohr, Kurtz and even I worked every night on the supersonic zeppelin. The engineers were doing calculations and making simulator runs in their computers. I was drawing up a business plan, as close to a work of fiction as anything on the Best Sellers list. My social life went to zero, which was—I have to admit—not all that much of a drop. Except for Driver's luscious executive assistant, Lisa, who worked some nights to help us. I wished I had the time to ask her to dinner.

Grand worked away every night, too. On a glossy set of illustrations to use as a presentation.

We made our presentation to Driver. The guys' calculations, my business plan, and Grand's images. He didn't seem impressed, and I left the meeting feeling pretty gunky. Over the six weeks I'd come to like the idea of a supersonic zeppelin, an SSZ. I really believed it was my ticket to advancement. Besides, now I had no excuse to see Lisa, up in Driver's office.

On the plus side, though, none of the APT team was laid off. We went through the motions of the Christmas office party with the rest of the undead. Talk about a survivor's reality show!

I was moping in my cubicle the morning after Christmas when my phone beeped and Driver's face came up on my screen.

"Drop your socks and pack a bag. You're going with me to Washington to sell the SSZ concept."

"Yessir!" I said automatically. "Er ... when?"

"Tomorrow, bright and early."

I raced to Grand's cubicle, but he already knew about it.

"So we're both going," I said, feeling pretty excited.

"No, only you and Driver," he said.

"But why aren't you—"

Grand gave me a knowing smile. "Driver wants all the credit for himself if the idea sells."

That nettled me, but I knew better than to argue about it. Instead, I asked, "And if it doesn't sell?"

"You get the blame for a stupid idea. You're low enough on the totem pole to be offered up as a sacrificial victim."

I nodded. I didn't like it, but I had to admit it was a good lesson in management. I tucked it away in my mind for future reference.

I'd never been to Washington before. It was chilly, gray and clammy; no comparison to sunny Phoenix. The traffic made me dizzy, but Driver thought it was pretty light. "Half the town's on holiday vacations," he told me as we rode a seedy, beat-up taxicab to the magnificent glass and stainless steel high-rise office building that housed the Transportation Department.

As we climbed out of the smelly taxi I noticed the plaque on the wall by the revolving glass doors. It puzzled me.

"Transportation and Urban Renewal Department?" I asked. "Since when ..."

"Last year's reorganization," Driver said, heading for the revolving door. "They put the two agencies together. Next year they'll pull them apart, when they reinvent the government again."

"Welcome to TURD headquarters," said Tracy Keene, once we got inside the building's lobby.

Keene was Anson Aerospace's crack-erjack Washington representative, a large round man who conveyed the impression that he knew things no one else knew. Keene's job was to find new customers for Anson from among the tangle of government agencies, placate old customers when Anson inevitably alienated them, and guide visitors from home base through the Washington maze. The job involved grotesque amounts of wining and dining. I had been told that Keene

had once been as wiry and agile as a Venezuelan shortstop. Now he looked to me like he was on his way to becoming a Sumo wrestler. And what he was gaining in girth he was losing in hair.

"Let's go," Keene said, gesturing toward the security checkpoint that blocked the lobby. "We don't want to be late."

Two hours later Keene was snoring softly in a straight-backed metal chair while Driver was showing the last of his PowerPoint images to Roger K. Memo, Assistant Under Director for Transportation Research of TURD.

Memo and his chief scientist, Dr. Alonzo X. Pencilbeam, were sitting on one side of a small conference table, Driver and I on the other. Keene was at the end, dozing restfully. The only light in the room came from the little projector, which threw a blank glare onto the wan yellow wall that served as a screen now that the last image had been shown.

Driver clicked the projector off. The light went out and the fan's whirring noise abruptly stopped. Keene jerked awake and instantly reached around and flicked the wall switch that turned on the overhead lights. I had to admire the man's reflexes.

Although the magnificent TURD building was sparkling new, Memo's spacious office somehow looked seedy. There wasn't enough furniture for the size of it: only a government issue steel desk with a swivel chair, a half-empty bookcase, and this slightly wobbly little conference table with six chairs that didn't match. The walls and floors were bare and there was a distinct echo when anyone spoke or even walked across the room. The only window had vertical slats instead of a curtain, and it looked out on a parking building. The only decoration on the walls was Memo's doctoral degree, purchased from some obscure "distance learning" school in Mississippi.

Driver fixed Memo with his steely gaze across the conference table. "Well, what do you think of it?" he asked subtly.

Memo pursed his lips. He was jowly fat, completely bald, wore glasses and a rumpled gray suit.

"I don't know," he said firmly. "It sounds ... unusual ..."

Dr. Pencilbeam was sitting back in his chair and smiling benignly. His PhD had been earned in the 1970s, when newly-graduated physicists were driving taxicabs on what they glumly called "Nixon fellowships." He was very thin, fragile looking, with the long skinny limbs of a preying mantis.

Pencilbeam dug out his jacket pocket and pulled out an electronic game. Reformed smoker, I thought. He needs something to do with his hands.

"It certainly looks interesting," he said in a scratchy voice while his game softly beeped and booped. "I imagine it's technically achievable ... and lots of fun."

Memo snorted. "We're not here to have fun."

Keene leaned across the table and fixed Memo with his best *here's something from behind the scenes* expression. "Do you realize how the White House would react to a sensible program for a supersonic transport? With the *Concorde* gone, you could put this country into the forefront of air transportation again."

"H'mm," said Memo. "But ..."

"Think of the jobs this program can create. The President is desperate to improve the employment figures."

"I suppose so ..."

"National prestige," Keene intoned knowingly. "Aerospace employment ... balance of payments ... gold outflow ... the President would be terrifically impressed with you."

"H'mm," Memo repeated. "I see ..."

I could see where the real action was, so I wangled myself an assignment to the company's Washington office as Keene's special assistant for the SSZ proposal. That's when I started learning what money and clout—and the power of influence—are all about.

As the months rolled along, we gave lots of briefings and attended lots of cocktail parties. I knew we were on the right track when no less than Roger K. Memo invited me to accompany him to one of the swankiest parties of the season. Apparently he thought that since I was from Anson's home office in Phoenix I must be an engineer and not just another salesman.

The party was in full swing by the time Keene and I arrived. It was nearly impossible to hear your own voice in the swirling babble of chatter and clinking glassware. In the middle of the sumptuous living room the Vice President was demonstrating his golf swing. Several Cabinet wives were chatting in the dining room. Out in the foyer, three Senators were comparing fact-finding tours they were arranging for themselves to the Riviera, Bermuda, and American Samoa, respectively.

Memo never drank anything stronger than ginger ale, and I followed his example. We stood in the doorway between the foyer and the living room, hearing snatches of conversation among the three junketing Senators. When the trio broke up, Memo intercepted Senator Goodyear (R., Ohio) as he headed toward the bar.

"Hello, Senator!" Memo shouted heartily. It was the only way to be heard over the party noise.

"Ah ... hello." Senator Goodyear obviously thought that he was supposed to know Memo, and just as obviously couldn't recall his name, rank, or influence rating.

Goodyear was more than six feet tall, and towered over Memo's paunchy figure. Together they shouldered their way through the crowd around the bar, with me trailing them like a rowboat being towed behind a yacht. Goodyear ordered bourbon on the rocks, and therefore so did Memo. But he merely held onto his glass while the Senator immediately began to gulp at his drink.

A statuesque blonde in a spectacular

gown sauntered past us. The Senator's eyes tracked her like a battleship's range finder following a moving target.

"I hear you're going to Samoa," Memo shouted as they edged away from the bar, following the blonde.

"Eh ... yes," the Senator answered cautiously, in a tone he usually reserved for news reporters.

"Beautiful part of the world," Memo shouted.

The blonde slipped an arm around the waist of one of the young, long-haired men and they disappeared into another room. Goodyear turned his attention back to his drink.

"I said," Memo repeated, standing on tiptoes, "that Samoa is a beautiful place."

Nodding, Goodyear replied, "I'm going to investigate ecological conditions there ... my committee is considering legislation on ecology, you know."

"Of course. Of course. You've got to see things firsthand if you're going to enact meaningful legislation."

Slightly less guardedly, Goodyear said, "Exactly."

"It's a long way off, though," Memo said.

"Twelve hours from LAX."

"I hope you won't be stuck in economy class. They really squeeze the seats in there."

"No, no," said the Senator. "First class all the way."

At the taxpayers' expense, I thought.

"Still," Memo sympathized, "It must take considerable dedication to undergo such a long trip."

"Well, you know, when you're in public service you can't think of your own comforts."

"Yes, of course. Too bad the SST isn't flying anymore. It could have cut your travel time in half. That would give you more time to stay in Samoa ... investigating conditions there."

The hearing room in the Capitol was jammed with reporters and camera crews. Senator Goodyear sat in the cen-

ter of the long front table, as befitted the committee chairman. I was in the last row of spectators, as befitted the newly promoted junior Washington representative of Anson Aerospace Corp. I was following the industry's routine procedure and riding the SSZ program up the corporate ladder.

All through the hot summer morning the committee had listened to witnesses: my former boss John Driver, Roger K. Memo, Alonzo Pencilbeam and many others. The concept of the supersonic zeppelin unfolded before the news media and started to take on definite solidity in the rococo-trimmed hearing chamber.

Senator Goodyear sat there solemnly all morning, listening to the carefully rehearsed testimony and sneaking peeks at the greenery outside the big sunny window. Whenever he remembered the TV cameras he sat up straighter and tried to look lean and tough. I'd been told he had a drawer full of old Clint Eastwood flicks in his Ohio home.

Now it was his turn to summarize what the witnesses had told the committee. He looked straight into the bank of cameras, trying to come on strong and determined, like a high plain drifter.

"Gentlemen," he began, immediately antagonizing the women in the room, "believe that what we have heard here today can mark the beginning of a new program that will revitalize the American aerospace industry and put our great nation back in the forefront of international commerce—"

One of the younger Senators at the far end of the table, a woman, interrupted:

"Excuse me, Mr. Chairman, but my earlier question about pollution was never addressed. Won't the SSZ use the same kind of jet engines that the *Concord* used? And won't they cause just as much pollution?"

Goodyear glowered at the junior member's impudence, but controlled his temper well enough to say only, "Em ...

Dr. Pencilbeam, would you care to comment on that question?"

Half-doing at one of the front benches, Pencilbeam looked startled at the mention of his name. Then he got to his feet like a carpenter's ruler unfolding, went to the witness table, sat down and hunched his bony frame around the microphone there.

"The pollution from the *Concorde* was so minimal that it had no measurable effect on the stratosphere. The early claims that a fleet of SSTs would create a permanent cloud deck over the northern hemisphere and completely destroy the ozone layer were never substantiated."

"But there were only a half-dozen *Concordes* flying," said the junior Senator. "If we build a whole fleet of SSZs—"

Before she could go any farther Goodyear fairly shouted into his microphone, "Rest assured that we are well aware of the possible pollution problem." He popped his P's like artillery bursts. "More importantly, the American aerospace industry is suffering, employment is in the doldrums, and our economy is slumping. The SSZ will provide jobs and boost the economy. Our engineers will, I assure you, find ways to deal with any and every pollution problem that may be associated with the SSZ."

I had figured that somebody, sooner or later, would raise the question of pollution. The engineers back in Phoenix wanted to look into the possibilities of using hydrogen fuel for the SSZ's jet engines, but I figured that just the mention of hydrogen would make people think of the old *Hindenberg*, and that would scuttle the program right there and then. So we went with ordinary turbojet engines that burned ordinary jet fuel.

But I went a step farther. In my capacity as a junior (and rising) executive, I used expense-account money to plant a snoop in the organization of the nation's leading ecology freak, Mark Sequoia. It turned out that, unknown to Sequoia,

Anson Aerospace was actually his biggest financial contributor. Politics make strange bedfellows, doesn't it?

You see, Sequoia had fallen on relatively hard times. Once a flaming crusader for ecological salvation and environmental protection, Sequoia had made the mistake of letting the Commonwealth of Pennsylvania hire him as the state's Director of Environmental Protection. He had spent nearly five years earnestly trying to clean up Pennsylvania, a job that had driven four generations of the original Penn family into early Quaker graves. The deeper Sequoia buried himself in the solid waste politics of Pittsburgh, Philadelphia, Chester, Erie and other hopelessly corrupted cities, the fewer dedicated followers and news media headlines he attracted. After a very credible Mafia threat on his life, he quite sensibly resigned his post and returned to private life, scarred but wiser. And alive.

When the word about the SSZ program reached him, Sequoia was hiking along a woodland trail in Fairmount Park, Philadelphia, leading a scraggly handful of sullen high school students through the park's soot-ravaged woodlands on a steaming August afternoon. They were dispiritedly picking up empty beer cans and gummy prophylactics—and keeping a wary eye out for muggers. Even full daylight was no protection against assault. And the school kids wouldn't help him, Sequoia knew. Half of them would jump in and join the fun.

Sequoia was broad-shouldered, almost burly. His rugged face was seamed by weather and news conferences. He looked strong and fit, but lately his back had been giving him trouble and his old trick knee ...

He heard someone pounding up the trail behind him.

"Mark! Mark!"

Sequoia turned to see Larry Helper, his oldest and therefore most trusted aide, running along the gravel path to-

ward him, waving a copy of the *Daily News* over his head. Newspaper pages were slipping from his sweaty grasp and fluttering off into the bushes.

"Littering," Sequoia muttered in a tone sometimes used by archbishops when facing a case of heresy.

"Some of you kids," said Sequoia in his most authoritative voice, "pick up those newspaper pages."

A couple of the students lackadaisically ambled after the fluttering sheets.

"Mark, look here!" Helper skidded to a gritty stop on the gravel and breathlessly waved the front page of the newspaper. "Look!"

Sequoia grabbed his aide's wrist and took what was left of the newspaper from him. He frowned at Helper, who cringed and stepped back.

"I . . . I thought you'd want to see . . ."

Satisfied that he had established his dominance, Sequoia turned his attention to the front page's blaring headline.

"Supersonic *zeppelin*?"

Two nights later, Sequoia was meeting with a half-dozen men and women in the basement of a prosperous downtown church that specialized in worthy causes capable of filling the pews upstairs.

Once Sequoia called his meeting I was informed by the mole I had planted in his pitiful little group of do-gooders. As a newcomer to the scene, I had no trouble joining Sequoia's Friends of the Planet organization, especially when I FedEx'd them a personal check for a thousand dollars—for which Anson Aerospace reimbursed me, of course.

So I was sitting on the floor like a good environmental activist while Sequoia paced across the little room. There was no table, just a few folding chairs scattered around, and a locked bookcase stuffed with tomes about sex and marriage. I could tell just from looking at Sequoia that the old activist flames were burning inside him again. He felt alive, strong, the center of attention.

"We can't just drive down to Washing-

ton and call a news conference," he exclaimed, pounding a fist into his open palm. "We've got to do something dramatic!"

"Automobiles pollute, anyway," said one of the women, a comely redhead whose dazzling green eyes never left Sequoia's broad, sturdy-looking figure.

"We could take the train; it's electric."

"Power stations pollute."

"Airplanes pollute, too."

"What about riding down to Washington on horseback! Like Paul Revere!"

"Horses pollute."

"They do?"

"Ever been around a stable?"

"Oh."

Sequoia pounded his fist again. "I've got it! It's perfect!"

"What?"

"A balloon! We'll ride down to Washington in a non-polluting balloon filled with helium. That's the dramatic way to emphasize our opposition to this SSZ monster."

"Fantastic!"

"Marvelous!"

The redhead was panting with excitement. "Oh, Mark, you're so clever. So dedicated." There were tears in her eyes.

Helper asked softly, "Uh . . . does anybody know where we can get a balloon? And how much they cost?"

"Money is no object," Sequoia snapped, pounding his fist again. Then he wrung his hand; he had pounded too hard.

When the meeting finally broke up, Helper had been given the task of finding a suitable balloon, preferably one donated by its owner. I had volunteered to assist him. Sequoia would spearhead the effort to raise money for a knockdown fight against the SSZ. The redhead volunteered to assist him. They left the meeting arm in arm.

I was learning the Washington lobbying business from the bottom up, but rising fast. Two weeks later I was in the White House, no less, jammed in among

news reporters and West Wing staffers waiting for a presidential news conference to begin. TV lights were glaring at the empty podium. The reporters and camera crews shuffled their feet, coughed, talked to one another. Then:

"Ladies and gentlemen: the President of the United States."

We all stood up and applauded as she entered. I had been thrilled to be invited to the news conference. Well, actually it was Keene who'd been invited and he brought me with him, since I was the Washington rep for the SSZ project. The President strode to the podium and smiled at us in what some cynics had dubbed her rattlesnake mode. I thought she was being gracious.

"Before anything else, I have a statement to make about the tragic misfortune that has overtaken one of our finest public figures, Mark Sequoia. According to the latest report I have received from the Coast Guard—no more than ten minutes ago—there is still no trace of his party. Apparently the balloon they were riding in was blown out to sea two days ago, and nothing has been heard from them since.

"Now let me make this perfectly clear. Mr. Sequoia was frequently on the other side of the political fence from my administration. He was often a critic of my policies and actions, policies and actions that I believe in completely. He was on his way to Washington to protest our new supersonic zeppelin program when this unfortunate accident occurred.

"Mr. Sequoia opposed the SSZ program despite the fact that this project will employ thousands of aerospace engineers who are otherwise unemployed and untrainable. Despite the fact that the SSZ program will save the American dollar on the international market and salvage American prestige in the technological battleground of the world.

"And we should keep in mind that France and Russia have announced that they are studying the possibility of joint-

ly starting their own SSZ effort, a clear technological challenge to America."

Gripping the edges of the podium tighter, the President went on, "Rumors that his balloon was blown off course by a flight of Air Force jets are completely unfounded, the Secretary of Defense assures me. I have dispatched every available military, Coast Guard, and Civil Air Patrol plane to search the entire coastline from Cape Cod to Cape Hatteras. We will find Mark Sequoia and his brave though misguided band of ecofr . . . er, activists—or their remains."

I knew perfectly well that Sequoia's balloon had not been blown out to sea by Air Force jets. They were private planes: executive jets, actually.

"Are there any questions?" the President asked.

The Associated Press reporter, a hickory-tough old man with thick glasses and a snow-white goatee, got to his feet and asked, "Is that a Versace dress you're wearing? It's quite becoming."

The President beamed. "Why, thank you. Yes, it is . . ."

Keene pulled me by the arm. "Let's go. We've got nothing to worry about here."

I was rising fast, in part because I was willing to do the legwork (and dirty work, like Sequoia) that Keene was too lazy or too squeamish to do. He was still head of our Washington office, in name. I was running the SSZ program, which was just about the only program Anson had going for itself, which meant that I was running the Washington office in reality.

Back in Phoenix, Bob Wisdom and the other guys had become the nucleus of the team that was designing the SSZ prototype. The program would take years, we all knew, years in which we had assured jobs. If the SSZ actually worked the way we designed it, we could spend the rest of our careers basking in its glory.

I was almost getting accustomed to being called over to the West Wing to

deal with bureaucrats and politicians. Still, it was a genuine thrill when I was invited into the Oval Office itself.

The President's desk was cleared of papers. Nothing cluttered the broad expanse of rosewood except the telephone console, a black-framed photograph of her late husband (who had once also sat at that desk), and a gold-framed photograph of her daughter on her first day in the House of Representatives (D., Ark.).

She sat in her high-backed leather chair and fired instructions at her staff.

"I want the public to realize," she instructed her media consultant, "that although we are now in a race with the Russians and the French, we are building the SSZ for sound economic and social reasons, not because of competition from overseas."

"Yes, Ma'am," said the media consultant.

She turned to the woman in charge of Congressional liaison. "And you'd better make damned certain that the Senate appropriations committee okays the increased funding for the SSZ prototype. Tell them that if we don't get the extra funding we'll fall behind the Ivans and the Frogs.

"And I want you," she pointed a manicured finger at the research director of TURD, "to spend every nickel of your existing SSZ money as fast as you can. Otherwise we won't be able to get the additional appropriation out of Congress."

"Yes, Ma'am," said Roger K. Memo, with one of his rare smiles.

"But, Madam President," the head of the Budget Office started to object.

"I know what you're going to say," the President snapped at him. "I'm perfectly aware that money doesn't grow on trees. But we've got to get the SSZ prototype off the ground, and do it before next November. Take money from education, from the space program, from the environmental superfund—I don't care how you do it, just get it done. I want the SSZ prototype up and flying by

next summer, when I'm scheduled to visit Paris and Moscow."

The whole staff gasped in sudden realization of the President's masterful plan.

"That right," she said, smiling slyly at them. "I intend to be the first Chief of State to cross the Atlantic in a supersonic zeppelin."

Although none of us realized its importance at the time, the crucial incident, we know now, happened months before the President's decision to fly the SSZ to Paris and Moscow. I've gone through every scrap of information we could beg, borrow or steal about that decisive day, reviewing it all time and again, trying to find some way to undo the damage.

It happened at the VA hospital in Hagerstown, a few days after Mark Sequoia had been rescued. The hospital had never seen so many reporters. There were news media people thronging the lobby, lounging in the halls, bribing nurses, sneaking into elevators and even surgical theaters (where several of them fainted). The parking lot was a jumble of cars bearing media stickers and huge TV vans studded with antennas.

Only two reporters were allowed to see Mark Sequoia on any given day, and they were required to share their interviews with all the others in the press corps. Today the two—picked by lot—were a crusty old veteran from Fox News and a perky young blonde from *Women's Wear Daily*.

"But I've told your colleagues what happened at least a dozen times," mumbled Sequoia from behind a swathing of bandages.

He was hanging by both arms and legs from four traction braces, his backside barely touching the crisply sheeted bed. Bandages covered eighty percent of his body and all of his face, except for tiny slits for his eyes, nostrils and mouth.

The Fox News reporter held his palm-sized video camera in one hand while

he scratched at his stubbled chin with the other. On the opposite side of the bed, the blonde held a similar video-corder close to Sequoia's bandaged face.

She looked misty-eyed. "Are ... are you in much pain?"

"Not really," Sequoia answered bravely, with a slight tremor in his voice.

"Why all the traction?" asked Fox News. "The medics said there weren't any broken bones."

"Splinters," Sequoia answered weakly.

"Bone splinters!" gasped the blonde. "Oh, how awful!"

"No," Sequoia corrected. "Splinters. Wood splinters. When the balloon finally came down we landed in a clump of trees just outside Hagerstown. I got thousands of splinters. It took most of the surgical staff three days to pick them all out of me. The chief of surgery said he was going to save the wood and build a scale model of the *Titanic* with it."

"Oh, how painful!" The blonde insisted on gasping. She gasped very well, Sequoia noted, watching her blouse.

"And what about your hair?" Fox News asked.

Sequoia felt himself blush underneath the bandages. "I ... uh ... I must have been very frightened. After all, we were aloft in that stupid balloon for six days, without food, without anything to drink except a six pack of Perrier. We went through a dozen different thunderstorms ..."

"With lightning?" the blonde asked.

Nodding painfully, Sequoia replied, "We all thought we were going to die."

Fox News frowned. "So your hair turned white from fright. There was some talk that cosmic rays did it."

"Cosmic rays? We never got that high. Cosmic rays don't have any effect on you until you get really up there, isn't that right?"

"How high did you go?"

"I don't know," Sequoia answered. "Some of those updrafts in the thunderstorms pushed us pretty high. The air got kind of thin."

"But not high enough to cause cosmic ray damage."

"Well, I don't know ... maybe ..."

"It'd make a better story than just being scared," said Fox News. "Hair turned white by cosmic rays. Maybe even sterilized."

"Sterilized?" Sequoia yelped.

"Cosmic rays do that, too," Fox News said. "I checked."

"Well, we weren't *that* high."

"You're sure?"

"Yeah ... well, I don't think we were that high. We didn't have an altimeter with us ..."

"But you could have been."

Shrugging was sheer torture, Sequoia found.

"Okay, but those thunderstorms could've lifted you pretty damned high."

Before Sequoia could think of what to answer, the door to his private room opened and a horse-faced nurse said firmly, "That's all. Time's up. Mr. Sequoia must rest now. After his enema."

"Okay, I think I've got something to hang a story on," Fox News said with a satisfied grin. "Now to find a specialist in cosmic rays."

The blonde looked thoroughly shocked and terribly upset. "You ... you don't think you were really sterilized, do you?"

Sequoia tried to make himself sound worried and brave at the same time. "I don't know. I just ... don't know."

Late that night the blonde snuck back into his room, masquerading as a nurse. If she knew the difference between sterilization and impotence she didn't tell Sequoia about it. For his part, he forgot about his still-tender skin and the traction braces. The morning nurse found him unconscious, one shoulder dislocated, most of his bandages rubbed off, his skin terribly inflamed, and a goofy grin on his face.

I knew that the way up the corporate ladder was to somehow acquire a staff that reported to me. And, in truth, the

SSZ project was getting so big that I truly needed more people to handle it. I mean, all the engineers had to do was build the damned thing and make it fly. I had to make certain that the money kept flowing, and that wasn't easy. An increasingly large part of my responsibilities as the *de facto* head of the Washington office consisted of putting out fires.

"Will you look at this!"

Senator Goodyear waved the morning *Post* at me. I had already read the electronic edition before I'd left my apartment that morning. Now, as I sat at Tracy Keene's former desk, the senator's red face filled my phone screen.

"That Sequoia!" he grumbled. "He'll stop at nothing to destroy me. Just because the Ohio River melted his houseboat, all those years ago."

"It's just a scare headline," I said, trying to calm him down. "People won't be sterilized by flying in the supersonic zeppelin any more than they were by flying in the old *Concorde*."

"I know it's bullshit! And you know it's bullshit! But the goddamned news media are making a major story out of it! Sequoia's on every network talk show. I'm under pressure to call for hearings on the sterilization problem!"

"Good idea," I told him. "Have a Senate investigation. The scientists will prove that there's nothing to it."

That was my first mistake. I didn't get a chance to make another.

I hightailed it that morning to Memo's office. I wanted to see Pencilbeam and start building a defense against this sterilization story. The sky was gray and threatening. An inch or two of snow was forecast, and people were already leaving their offices for home, at ten o'clock in the morning. Dedicated government bureaucrats and corporate employees, taking the slightest excuse to knock off work.

The traffic was so bad that it had actually started to snow, softly, by the time I reached Memo's office. He was pacing

across the thinly carpeted floor, his shoes squeaking unnervingly in the spacious room. Copies of *The Washington Post*, *The New York Times* and *Aviation Week* were spread across his usually immaculate desk, but his attention was focused on his window, where we could see fluffy snowflakes gently drifting down.

"Traffic's going to get worse as the day goes on," Memo muttered.

"They're saying it'll only be an inch or so," I told him.

"That's enough to paralyze this town."

Yeah, especially when everybody jumps in their cars and starts fleeing the town as if a terrorist nuke is about to go off, I replied silently.

Aloud, I asked, "What about this sterilization business? Is there any substance to the story?"

Memo glanced sharply at me. "They don't need substance as long as they can start a panic."

Dr. Pencilbeam sat at one of the unmatched conference chairs, all bony limbs and elbows and knees.

"Relax, Roger," Pencilbeam said calmly. "Congress isn't going to halt the SSZ program. It means too many jobs, too much international prestige. And besides, the President has staked her credibility on it."

"That's what worries me," Memo muttered.

"What?"

But Memo's eye was caught by movement outside his window. He waddled past his desk and looked down into the street below.

"Oh, my God..."

"What's going on?" Pencilbeam unfolded like a pocket ruler into a six-foot-long human and hurried to the window. Outside, in the thin mushy snow, a line of somber men and women were filing along the street past the TURD building, bearing signs that screamed:

STOP THE SSZ!
 DON'T STERILIZE
 THE HUMAN RACE

SSZ MURDERS UNBORN CHILDREN ZEPPELINS GO HOME!

"Isn't that one with the sign about unborn children a priest?" Pencilbeam asked.

Memo shrugged. "Your eyes are better than mine."

"Ah-hah! And look at this!"

Pencilbeam pointed a long, bony finger farther down the street. Another swarm of people were advancing on the building. They also carried placards:

SSZ FOR ZPG
ZEPPELINS SI! BABIES NO!
ZEPPELINS FOR
POPULATION CONTROL
UP THE SSZ

Memo sagged against the window. "This ... this is awful."

The Zero Population Growth group marched through the thin snowfall straight at the environmentalists and anti-birth-control pickets. Instantly the silence was shattered by shouts and taunts. Shrill female voices battled against rumbling baritones and basses. Placards wavered. Bodies pushed. Someone screamed. One sign struck a skull and then bloody war broke out.

Memo, Pencilbeam and I watched aghast until the helmeted TAC squad police doused the whole tangled mess of them with riot gas, impartially clubbed men and woman alike and carted everyone off, including three bystanders and a homeless panhandler.

The Senate hearings were such a circus that Driver summoned me back to Phoenix for a strategy session with Anson's top management. I was glad to get outside the Beltway, and especially glad to see Lisa again. She even agreed to have dinner with me.

"You're doing a wonderful job there in Washington," she said, smiling with gleaming teeth and flashing eyes.

My knees went weak, but I found the courage to ask, "Would you consider transferring to the Washington office? I could use a sharp executive assistant—"

She didn't even let me finish. "I'd love to!"

I wanted to do handsprings. I wanted to grab her and kiss her hard enough to bruise our lips. I wanted to, but Driver came out of his office just at that moment, looking his jaw-jutting grimmest.

"Come on, kid. Time to meet the top brass."

The top brass was a mixture of bankers and former engineers. To my disgust, instead of trying to put together a strategy to defeat the environmentalists, they were already thinking about how many men and women they'd have to lay off when Washington pulled the plug on the SSZ program.

"But that's crazy!" I protested. "The program is solid. The President herself is behind it."

Driver fixed me with his steely stare. "With friends like that, who needs enemies?"

I left the meeting feeling very depressed, until I saw Lisa again. Her smile could light up the world.

Before heading back to Washington to fight Sequoia's sterilization propaganda, I looked up my old APT buddies. They were in the factory section where the SSZ was being fabricated.

The huge factory assembly bay was filled with the aluminum skeleton of the giant dirigible. Great gleaming metal ribs stretched from its titanium nose cap to the more intricate cagework of the tail fins. Tiny figures with flashing laser welders crawled along the ribbing like maggots cleaning the bones of some noble whale.

Even the jet engines sitting on their carrying pallets dwarfed human scale. Some of the welders held clandestine poker games inside their intake cowlings, Bob Wisdom told me. The cleaning crews kept quiet about the spills, crumbs and other detritus they found in them night after night. I stood with Bob, Ray Kurtz, Tommy Rohr and Richard Grand beside one of those huge engine pods, craning our necks to watch the

ANALOG

construction work going on high overhead. The assembly bay rang to the shouts of working men and women, throbbed with the hum of machinery, clanged with the clatter of metal against metal.

"It's going to be some Christmas party if Congress cancels this project," Kurtz muttered gloomily.

"Oh, they wouldn't dare cancel it now that the Women's Movement is behind it," said Grand, with a sardonic little smile.

Kurtz glared at him from behind his beard. "You wish. Half those idiots in Congress will vote against us just to prove they're pro-environment."

"Actually, the scientific evidence is completely on our side," Grand said. "And in the long run, the weight of evidence prevails."

He always acts as if he knows more than anybody else, I thought. But he's dead wrong here. He hasn't the foggiest notion of how Washington works. But he sounds so damned sure of himself! It must be that phony accent of his.

"Well, just listen to me, pal," said Wisdom, jabbing a forefinger at Grand. "I've been working on that secretary of mine since the last Christmas party, and if this project falls through and the party is a bust that palpitating hunk of femininity is going to run home and cry instead of coming to the party!"

Grand blinked at him several times, obviously trying to think of the right thing to say. Finally he enunciated, "Pity."

But I was thinking about Lisa. If the SSZ is cancelled, Driver won't let her transfer to the Washington office. There'd be no need to hire more staff for me. There'd be no need for me!

I went back to Washington determined to save the SSZ from this stupid sterilization nonsense. But it was like trying to stop a tsunami with a floor mop. The women's movement, the environmental movement, the labor unions, even Leno and Letterman got into the

act. The Senate hearings turned into a shambles; Pencilbeam and the other scientists were ignored while movie stars testified that they would never fly in an SSZ because of the dangers of radiation.

The final blow came when the President announced that she was not going to Paris and Moscow, after all. Urgent problems elsewhere. Instead, she flew to Hawaii for an economic summit of the Pacific nations. In her subsonic Air Force One.

The banner proclaiming HAPPY HOLIDAYS! drooped sadly across one wall of the company cafeteria. Outside in the late afternoon darkness, lights glimmered, cars were moving and a bright full moon shone down on a rapidly-emptying parking lot.

Inside the Anson Aerospace cafeteria was nothing but gloom. The Christmas party had been a dismal flop, primarily because half the company's work force had received layoff notices that morning. The tables had been pushed to one side of the cafeteria to make room for a dance floor. Syrupy holiday music oozed out of the speakers built into the acoustic tile of the ceiling. But no one was dancing.

Bob Wisdom sat at one of the tables, propping his aching head in his hands. Ray Kurtz and Tommy Rohr sat with him, equally dejected.

"Why the hell did they have to cancel the project two days before Christmas?" Rohr asked rhetorically.

"Makes for more pathos," Kurtz growled.

"It's pathetic, all right," Wisdom said. "I've never seen so many women crying at once. Or men, for that matter."

"Even Driver was crying, and he hasn't even been laid off," Rohr said.

"Well," Kurtz said, staring at the half-finished drink in front of him, "Sequoia did it. He's a big media hero again."

"And we're on the bread line," said Rohr.

"You got laid off?" I asked.

"Not yet—but it's coming. This place will be closing its doors before the fiscal year ends."

"It's not that bad," said Wisdom. "We still have the Air Force work. As long as they're shooting off cruise missiles, we'll be in business."

Rohr grimaced. "You know what gets me? The way the whole project was scrapped, without giving us a chance to complete the big bird and show how it'd work. Without a goddamned chance."

Kurtz said, "Congressmen are scared of people getting sterilized."

"Not really," I said. "They're scared of not being on the right handwagon."

All three of them turned toward me.

Rohr said, "Next time you dream up a project, pal, make it underground. Something in a lead mine. Or deeper still, a gold mine. Then Congress won't have to worry about cosmic rays."

Wisdom tried to laugh, but it wouldn't come.

"You know," I said slowly, "you just might have something there."

"What?"

"Where?"

"A supersonic transport—in a tunnel."

"Oh for Chri—"

But Wisdom sat up straighter in his chair. "You could make an air-cushion vehicle go supersonic. If you put it in a tunnel you get away from the sonic boom and the air pollution."

"The safety aspects would be better, too," Kurtz admitted. Then, more excitedly, "And pump the air out of the tunnel, like a pneumatic tube!"

Rohr shook his head. "You guys are crazy. Who the hell's going to build tunnels all over the country?"

"There's a lot of tunnels already built," I countered. "We could adapt them for the SSST."

"SSST?"

"Sure," I answered, grinning for the first time in weeks. "Supersonic subway train."

They stared at me. Rohr pulled out his PDA and started tapping on it. Wisdom got that faraway look in his eyes. Kurtz shrugged and said, "Why the hell not?"

I got up and headed for the door. Supersonic subway train. That's my ticket. I'm going back to Washington, I knew. And this time I'll bring Lisa with me. ■

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with your favorite authors!

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September 14 @ 10:00 P.M. EST

Chat about *The Treasured One* (Book 2 of *The Dreamers*).

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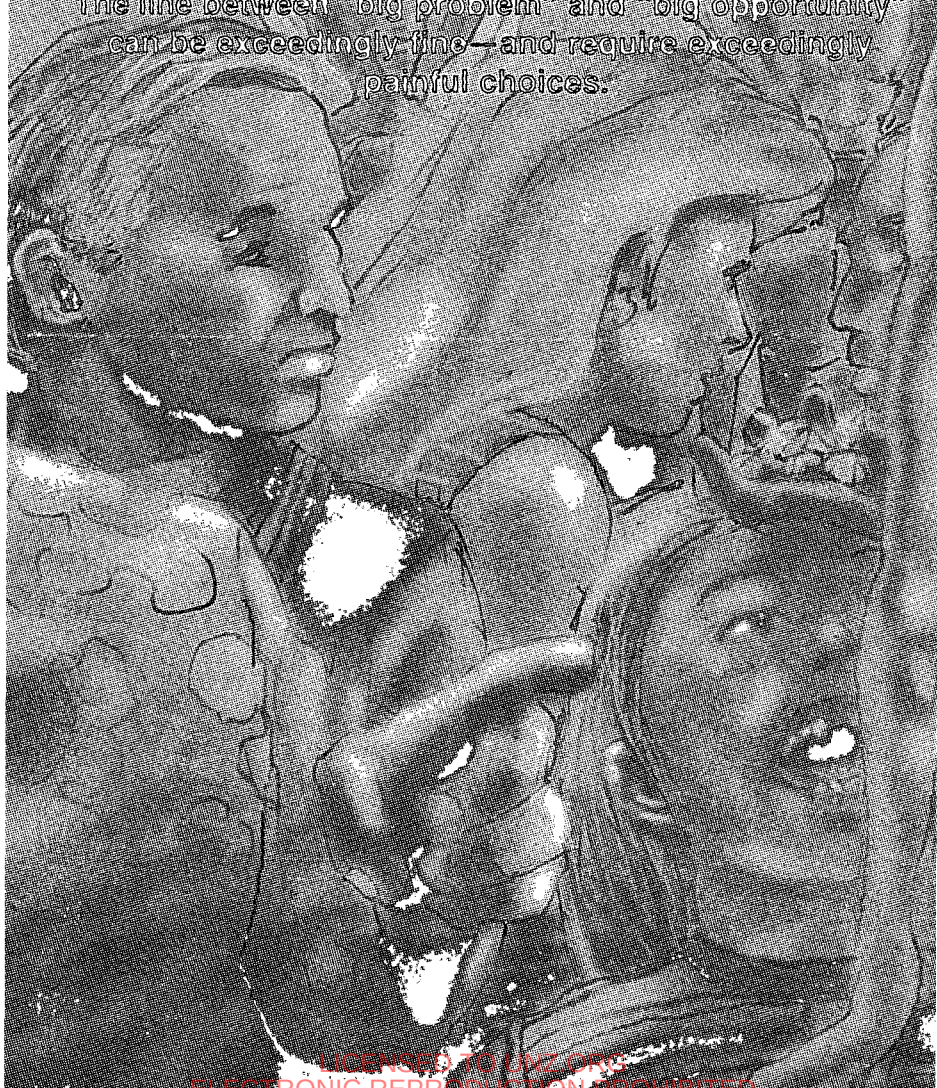
Go to www.scifi.com/chat or link to the chats via our home page (www.analogsf.com). Chats are held in conjunction with Asimov's and the Sci-fi Channel and are moderated by Asimov's editor, Gardner Dozois.

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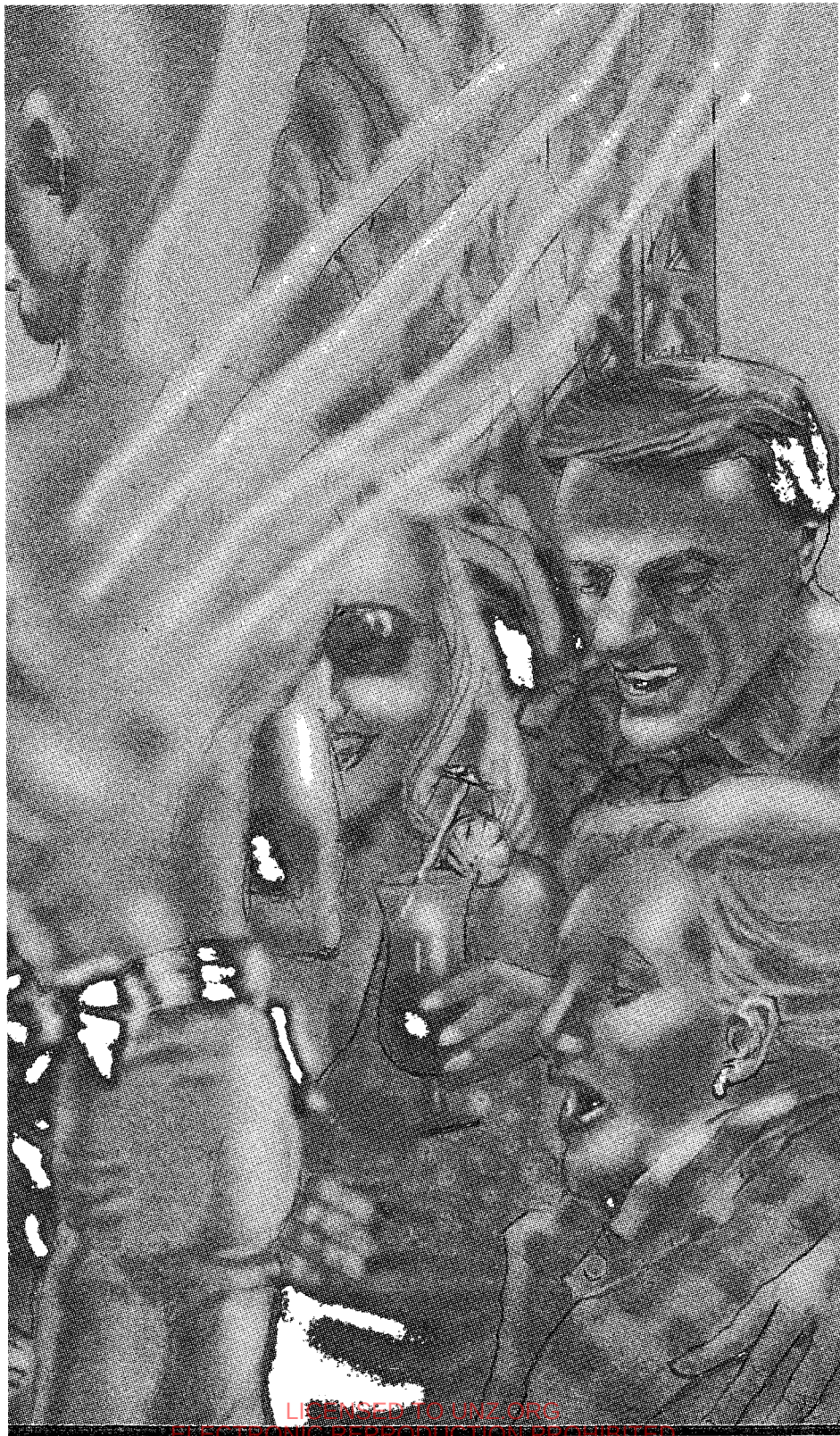
Mars Opposition

David Brin

The line between "big problem" and "big opportunity"
can be exceedingly fine—and require exceedingly
painful choices.



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When the Martians came, they proved unlike anything we imagined. Elegant, dauntingly tall and gleamingly enigmatic, they spilled out of a bizarre craft that appeared at dawn—gently and quite suddenly—on the ELV launch pad at Cape Canaveral.

We called the thing a “ship,” for lack of a better word. In fact, it more resembled an outcrop of ocher desert stone, a jumbled rock-pile that had been yanked from some faraway canyon and somehow deposited in swampy Florida. Nobody would imagine that it flew, except that a dozen eyewitnesses swore they had seen it descend, swiftly and almost silently, at daybreak.

For about an hour it just stood there, creaking and settling next to the gleaming derrick where unmanned space probes sometimes get hurled skyward atop pillars of flame. Pebbles and reddish dust—plus an occasional boulder—showered onto the concrete apron, covering scorch marks left by past fiery launches. Despite all the grit, we could tell the newcomers were far beyond primitive rockets.

Finally, from what appeared to be the mouths of several caves, creatures started emerging.

At first sight they seemed amorphous—hard to make out against the rocks and slanted dawn—slithering down slopes of glittering dust. But their forms changed before our eyes. Adapting to this environment? They seemed to unfold as they descended, rapidly gathering themselves upon slender, bipedal legs until several dozen spindly, multijointed humanoids finally stepped onto the concrete apron.

Like newly emerged butterflies, all of them turned toward the sun for a few minutes, preening and stretching tall, revealing long torsos covered with translucent, greenish skin that bulged in a pronounced hump across both shoulders. Soon each hump opened, spreading into a pair of diaphanous fans—like parasols,

or wings—that seemed to firm and gain shape under full daylight.

“The chief color is that same as chlorophyll,” commented Slade, using a spectrometer she had ingeniously yanked from the *Cheng Ho* spacecraft, hasty moments after the aliens were spotted. “Those wing-like appendages must be collectors. See how they face the sun? These critters make their own food supply as they walk around.”

Following her lead, several other Cape scientists were setting up instruments, adapting them to close-in view and peering excitedly at the newcomers, comparing notes till the first government officials arrived.

“Why here?” someone asked. “Why not Washington, or the U.N.?”

Wasn't that where aliens always came—in movies, that is—to the seats of deliberation, policy, and power? Or else dark country highways, intent on grabbing and probing another class of folks.

It dawned on us that perhaps these visitors had different values than movie producers. Other priorities than the UFO-faery creatures of our hallucinations.

It fell upon Assistant Director Cole—the highest official present—to step forward nervously as the Martians approached. Tall and imposing, they did not appear to be armed, though many of them carried what looked like *scrolls*, silvery and covered with some kind of jagged writing.

That seemed auspicious, at least. Perhaps they bore gifts of wisdom from the stars! Or technology. Cures for diseases? Engraved invitations to join the Galactic Federation?

Or perhaps an ultimatum.

Gotta hand it to Cole. Spreading his arms in a welcoming gesture as the leader drew near, he spoke hoarse but clear.

“Welcome to Earth. On behalf of the people of the United—”

The first of the tall aliens stopped in front of Cole, as expected . . .

...but other members of their delegation *kept going*, moving past the two of them, spreading out, heading for the dismayed crowd of spectators!

"Hello," the first one interrupted the Assistant Director in English. The alien's voice seemed rich in tones of metal, soot and stone.

"I seek information—"

If the first visitor said more, we were too distracted to listen. For as the rest of the gangly creatures fanned out, each of them chose a different person in the throng of onlookers to approach. One stepped right up to Slade, ignoring her instruments and looking down at her from a great height.

"Hello, I seek information," this one said, reiterating the leader's words, sounding like the grinding together of aged rocks. "I offer fair compensation, if you provide the datum required."

It reached into a pocket that had not been there a moment before ... an opening that appeared along one rib of that long torso. The alien's hand emerged, thrust forward and opened almost under her nose.

Slade stared at glittering objects.

Nuggets that had to be gold.

A jumble of faceted slivers that could only be diamonds.

"I believe you find these of value. I will trade them for information."

Slade blinked a couple of times, glancing to see that every space-visitor had chosen a different human to approach—from among those brave enough to remain when the delegation divided into a free-for-all. Though many fled, some of us stayed, rooted by curiosity, more powerful than fear.

A strangled sound was all Slade managed, at first, as she stared at the small pile of treasure, then back up at the gangling space-visitor. Finally, she murmured.

"Wha—what do you want to know?"

With uncanny agility - and without disturbing a single gemstone - the alien used its other hand to draw forth and

unfurl one of those glossy scrolls. Gripping a side with two opposable fingers, it sent two others snaking toward a column of text.

"I seek the human being whose name appears here ... eleventh on this list."

Peering over Slade's shoulder, I saw that the scroll bore a column of names, much longer than ought to fit. Through some technological wizardry, the words—all written in a serified, Roman font—multiplied in size wherever my gaze happened to fall. Microprinting became instantly readable.

I recognized several names, including one the alien pointed to.

Bruce Murray

Yes, the Caltech planetary scientist, former head of the Jet Propulsion Lab and president of the Planetary Society.

I nudged Slade, to get her attention, but she ignored me, hurrying to accommodate our guest.

"You want to meet Bruce? Why, he's right here at the Cape! Advising some new show for the Discovery Channel, I think. They were filming over at Pad One-A. But with all the commotion, I bet he's already nearby."

"Thank you. Here is your payment," the alien answered, pouring the small mound of nuggets and gems into her hand. Instantly more appeared. "I will pay you further to guide me directly to Bruce Murray."

I had already spotted the man in question, still handsome and charismatic after spending his entire adult life—more than half a century—helping to push humanity upward, outward, beyond Earth's cradle. As a matter of fact, Bruce Murray happened to be speaking to a different visitor!

That creature was even taller than the one facing Slade. But Bruce stood undaunted, with no apparent ill-ease, peering at another of the silvery scrolls that alien held in front of him. With a smile he turned and pointed west while utter-

ANALOG

ing a few words.

When the newcomer tried to hand over a fistful of treasure, Bruce shook his head, refusing payment for a simple act of courtesy.

This had an unexpected effect. The alien in front of Bruce Murray seemed to get *angry* ... or at least insistent, thrusting the glittering pile once again.

Meanwhile, still ignoring my nudge, Slade was already accepting her second fee. "Come on," she told her alien. "I'll introduce you to Bruce."

All around us a hubbub of confusion intensified as the space-visitors behaved in a manner never seen in film depictions of first contact. After speaking to some individual for a few minutes—and then handing over payment—each of the aliens simply turned and walked away! Several took the road leading west, toward Kennedy Space Center headquarters and the town beyond. Others headed cross-country, on diverging paths. Two aimed straight north, into a Florida swamp!

"Sorry if I offended you," I heard Bruce Murray tell his own visitor—one of the last remaining—trying to ease the creature's agitation. "I said I'll be happy to help you find Louis Friedman. I'd do it out of simple hospitality. But I see that it's culturally important to you for there to be some *quid-pro-quo*. Some fair exchange of value. So how about you pay me with information? Like where are you from? What's your name? Why are you looking for my friend Lou—"

He stopped as *our* alien approached in long strides, interrupting.

"You have been identified as Bruce Murray, whose name appears on this list," it said, as Slade and I hurried to catch up.

The taller creature turned, its parasol-wings fluttering in an angry display that flashed from green to spirals of deep red.

"You are interfering in a legitimate transaction," it told Slade's alien. "This one named Bruce Murray has demanded

specific information as payment in exchange for a service already rendered." Turning back to Bruce, the taller alien said—"Your terms are satisfactory. Here are your answers. I come from the planet you call Mars. My name translates as Wandering Stone. In my language it is pronounced—"

We never got a chance to hear the name in its native tongue. Because at that moment the shorter Martian—the one who had spoken to Slade—took out a slim gray object and shot Bruce Murray dead.

Commotion does not begin to describe what happened next, as most of the humans took flight amid screams of terror.

That part briefly resembled some tawdry sci-fi movie, though none of the remaining aliens seemed at all interested in pursuing. Soon, just a few of us were left, stunned, watching in riveted silence as two green aliens confronted each other over poor Bruce's smoldering body.

There came a furious exchange of irate noise between them. You didn't need translation to guess what was being said.

"You interfered in my legitimate transaction!" rattled Wandering Stone, drawing forth a weapon of its own.

"I offer compensation," the shorter Martian seemed to answer in the same grinding dialect, keeping its wings folded while swiftly presenting a handful of small objects. I noticed that they weren't gold nuggets or diamonds, but little cylinders. Probably vastly more valuable.

Wandering Stone paused, contemplating the pile. Then, in a blur, the gun was gone and the pile snatched up. Deal concluded.

Turning, Wandering Stone fixed a hard unblinking gaze on me. I tried not to quail.

"I seek the direct heir of Bruce Murray, in order to fulfill my obligation. I must finish answering the questions that he asked. Then I will need further guid-

ance to find Louis Friedman. I am willing to pay."

Meanwhile, Slade was confronted yet again by her own Martian.

"You performed excellent service, guiding me to Bruce Murray. Now I request further information. I will pay you to direct me to the next person on this list."

When the scroll was thrust again before Slade, she let out a yelp and ran.

I was not far behind.

During the week that followed, we all experienced a weird sense of helplessness as almost fifty tall, iridescent-green Martians spread out across the United States.

The government tried to keep everybody calm. After all, this didn't look like an invasion. Not by any standards we could recognize. No giant battlecraft hovered over our cities, demanding surrender under threat of mass annihilation.

There had been one profoundly violent act—true. But every other phase of this interplanetary encounter, before or after, had been courteous, personally forthright—and profitable to whichever individual human being got attention from an alien.

That aspect—their fixation on making a fair deal—seemed fundamentally reassuring at some level. Business, after all, is business.

So the death of Bruce Murray must have been some kind of aberration. A misunderstanding. Poring over footage from the moments leading up to the shooting, pundits and scholars puzzled over what inadvertent gesture or word Bruce must have performed, to provoke that sudden, violent response.

"Remember how many times *human beings* misread each other, during the age of European exploration," one historian reminded. "And those were just different cultures within the same species! Something is going on here. Something we haven't grasped yet. And as the weak-

er ones, we had better figure it out, real soon."

Within hours, every copy of *Guns, Germs and Steel*, by Jared Diamond, was plucked off the shelves by earnest readers. You couldn't even buy a copy online.

Meanwhile, the visitors fanned out, most of them striding with amazing speed northward, out of the Florida peninsula, into America proper. Whether cross-country, by highway or through a dense urban center, the specific path seemed at first to make no difference. Only direction, each one seeking a single-minded goal.

Most people quickly got out of their way, though gawkers and the passionately curious shouted questions whenever a Martian loped by—tailed by frantic journalists and hurriedly-assembled teams of marshals, assigned to protect these alien visitors from our more unbalanced citizens. Almost fifty little swarms, like fast-moving and erratic movie stars chased by fans, paparazzi and bodyguards. The marshals had to work in relays in order to keep up.

All of that soon changed, however, when a motorist stopped abruptly near one of the creatures, flung open his passenger door and offered a ride. For a price.

This caught the escorting marshals flat-footed, as the alien quickly agreed, handed over a fistful of riches, tucked away its solar collector wings and folded its long legs inside.

It took just moments. The pickup truck sped off.

Nobody could think of any legal reason to stop it.

Frenzied phone calls brought in helicopters to keep the truck in sight. But soon, somehow, word spread to the rest of the visitors. Wherever they were, other tall aliens abruptly headed for the nearest road and began sticking out their thumbs.

They must communicate, I thought at the time, pondering how well coordi-

nated it all seemed. *They must be very disciplined and cooperative.*

It just goes to show how easily a guy can fool himself.

Word spread quickly among humans, too. While a majority of citizens kept back in fear, there was no shortage of bold drivers, suddenly eager to pull over.

Hitchhiking Martians paid well for rides.

And for information—always seeking some person listed on one of those scrolls. Despite a rising sense of public unease, it wasn't hard for each alien to find someone—a shopkeeper or some passerby with a wireless link—willing to do a quick internet name-and-address search and then point the right way, often with a printed map.

Well, those diamonds were top quality.

Anyway, the government was loathe at first to interfere. This offered one way to find out why they had come and who they were looking for. No Martian asked for secrecy. So most of the information providers cashed-in twice by swiftly telling everything to the news media.

In a matter of hours we knew more than forty names.

What would *you* do, if you heard on TV that a Martian was looking for you?

After what we all witnessed at Cape Canaveral, acute interest focused on those who were asked-for. A diverse group, they shared one common trait—a passion for space flight. Only a few were scientists or engineers or NASA officials . . . some were school teachers, or accountants, or mechanics. But all believed in human expansion and adventure in the cosmos.

Not much to go on . . . though I began to wonder.

Any normal person, upon hearing that an alien was coming, would prudently stay away from home. Especially after what happened to Bruce Murray. But as I said, those being sought weren't exactly normal. Most of them had dreamed of *first contact* from an early age, cutting

their teeth on science fiction tales. Several, in fact, reacted to the news with excitement, hurrying *toward* their aliens, eager to meet them halfway.

By coincidence, the first two of these zealots reached their rendezvous within minutes of each other—thirty-one and a half hours after the ship from Mars arrived—several hundred miles apart.

"Are you Donna Shirley?" A green visitor asked, near Huntsville Alabama.

"Yes I am," answered a well-known space engineer, grinning and holding out her hand.

Whereupon the creature shot her dead.

"I seek another individual," it then said, turning toward the appalled journalists while their cameras beamed a gruesome scene across the world. Nervous marshals and guardsmen drew their weapons while frantically consulting Washington. But the Martian just ignored them.

"I will pay for information leading me to a human named James Arnold."

Meanwhile, at almost the same moment in Gainesville, standing over the smoldering corpse of a fiction author named Joe Haldeman, another alien said:

"I will now pay for information leading to Stanley Schmidt."

There was no more ambiguity. No hope that Bruce Murray's death had been a fluke.

We now had a general idea why the Martians had come—with a narrowly focused sense of purpose. One by one, they aimed to hunt down and kill every person whose name appeared on a list.

But what list?

All of those mentioned so far were Americans, a fact that offered strange reassurance elsewhere. Across the globe, near-panic ebbed away, replaced with a rising sense of this-doesn't-directly-threaten-us interest . . . accompanied perhaps by a kind of spectator *Schadenfreude* at seeing the planet's Top Dog face its long-deserved comeuppance

from dauntingly advanced extraterrestrials. Those who had been loudly demanding establishment of an International Contact Agency became less shrill. World leaders now urged patience—an attitude of watching, waiting.

That was fine for them. Within the borders of the United States, tension fizzed and nearly frothed over. By now, forty-seven alien creatures had dispersed from coast to coast, with nine of them unaccounted-for, having vanished into some confusion of either traffic or countryside. We discovered the hard way that those photo-active wings of theirs had multiple uses. Wrapped around the body, they could suddenly go into a mode that mimicked the environs, turning a Martian almost invisible.

Army special forces augmented the marshals now, trying to keep a wide cordon around each alien, using bullhorns, warning people to stay back. It didn't always work, though. The creatures moved *fast*. Without notice, one of them might veer toward anyone in sight, offering a handful of treasure for information or a ride.

Most people ran away, but so what? Roughly one in a hundred consented. That was enough.

The third, fourth and fifth deaths occurred before two full days had passed. A dozen more of the targeted people barely left their homes in time. But always, some neighbor was willing to point helpfully in the direction they had fled. Others might shout "collaborator!"—but diamonds can help overcome hurt feelings. And no one could legally stop it. Or at least, nobody in authority could cite a law that fit a case like this.

People—even governments—are capable of acting quickly in an emergency. A special session of Congress was called, aimed at passing a quick national security bill to close the loopholes, outlawing cooperation with the Martians and confiscating whatever payments they made. Anyone who helped guide them to a victim could be prosecuted as an access-

ry. Instant polls showed huge public support, driven by disgust toward that self-serving minority among us who would cooperate in this alien death-hunt, betraying their neighbors for riches.

The President promised to sign the bill within twenty-four hours. She sent Secret Service agents to protect every person known to be a target.

That's when I phoned up Dan Jensen, in Senator Green's office.

"Dan, you've got to get me into the hearing tomorrow."

"I dunno," he answered. "It's crazy up here on the Hill. We're on war footing. The hearing is supposed to last just the morning, then we rush the bill to the floor. What's wrong? Not urgent enough?"

"Maybe too urgent. There's something they have to know, before passing that law. Something I think I figured out."

"You *think*? Buddy boy, you better—"

"I better get down there and talk to you in person tonight. Lay it out. Just do me—do us all—a favor. Set aside fifteen minutes for me to speak tomorrow morning. You can cancel if I don't convince you tonight."

It took some persuading. But I had that much pull.

I wound up getting ten minutes. I just prayed I'd be in time.

"The names," I said, after being sworn in, "are all included on a disk that was carried to the Martian surface aboard *Spirit* and *Opportunity* . . . the Mars Exploration Rover spacecraft, or MER . . . back in January of 2003."

"On a disk?" one member of the committee asked. "For what purpose?"

"Public relations, Senator. Arranged by the Planetary Society, in collaboration with the LEGO Company. A mini-DVD, so small and light that it could be added without affecting mission performance or cost. It contained educational material, plus a *list* of space program supporters—people who signed on for the honor of having their names carried all the

ANALOG

way to Mars."

"Some honor. But I don't get it. None of the footage from those rover-robots showed signs of intelligent life. Or any life at all."

"The Martians appear to be—well—extremely adaptable, Senator. As you might expect for beings that evolved in such a challenging environment. We witnessed them change shape before our eyes, just after arriving. And those cape-like *wings*, that they spread to absorb sunlight, can shift from perfect black to green to intricate patterns mimicking any background. There may have been Martians in plain sight, for all I know, or dwelling nearby underground. Certainly close enough to be offended by MER, in some way we don't yet understand."

"And you think this disk filled with names . . . it covers everybody that the aliens have asked for?"

"So far. It's the only trait that every one of them has in common. It also explains how the Martians would have such a list, in hand, the moment they arrived. They must have got it directly from the disk."

"Interesting. That's one mystery solved . . . and about a hundred still unexplained. Like why they seem determined to go around *killing* people on the list! Do you have any ideas about that, doctor?"

"Some possibilities come to mind. Perhaps they did not like the idea of machines landing to spy on their planet—though a dozen earlier probes never triggered such response. Perhaps they are angry over *where* the two probes landed. Or something bad happened when they did. Anyway, the truth should be easy enough to find out."

"Oh, how's that?"

"Ask them. They are traders, above all else. For the right price, I'm sure one of the Martians will explain it all, in detail."

The committee's chief counsel spoke up.

"We've tried to ask! They ignore our representatives."

"True enough. And yet they speak to private citizens."

"In order to bribe them! To hitch rides from traitors, or else buy directions that will help them hunt down some American! The same kind of nasty, treasonous help that we're going to outlaw."

"Right. Exactly. And I'm here to warn you . . . that could be a terrible mistake."

Silence filled the conference room, until the chief counsel spoke again.

"You . . . *oppose* the bill currently before this committee?" He sounded perplexed, so unanimous had been the support up till now.

"I must oppose it, since the consequences of passing such a bill could be disastrous."

The senior senator from Oklahoma leaned forward, speaking softly.

"Could you please explain, doctor? So far, we've been careful not to shoot back at the creatures—though a public majority now wants massive retaliation next time another citizen is killed. This restraint is overwhelmingly difficult to maintain."

"Indeed, senator. I've been pleasantly surprised by the administration's wisdom in that regard. History warns that a weaker tribe should be cautious during first contact, especially not to let itself be provoked. Pride can be fatally expensive. So can revenge. We may have to absorb pain . . . a lot of it, stoically . . . before we're ready to demand respect."

"Is that why you oppose the bill, doctor? But this proposed legislation has nothing to do with fighting back! All it will do is impose penalties on a few greedy *humans*, to deter them from helping the aliens. If we arrest the collaborators and seize all those little piles of gold and diamonds, so nobody profits . . . then who will step forward to help the aliens with information? It could take the creatures ages, wandering around, to find their victims. We'd have time to set up protection programs, offer new identities, and hide everybody on

this list you told us about . . . how many people did you say are on it?"

"I didn't say, senator."

A look of puzzled exasperation crossed the politician's face.

"Well, could you please tell us, now? How many names were on those disks that *Spirit* and *Opportunity* carried to Mars?"

I coughed, feeling a sudden and powerful reluctance to speak. But then, the news media were probably looking it up already, on the web.

"How many? Um, senator, the disks held four million names."

It took a while for the Sergeant at Arms to restore order. I fretted as the clock finished ticking out my allotted ten minutes. Would they stop me before I got around to my real point?

I needn't have worried. Nobody tried to usher me out of the room. All were attentive when Senator Green spoke for the first time.

"Four million? Why that's . . . more than 1 percent of our population."

Or 10 percent of those who vote, I pondered during another long silence that finally broke when Senator Long distilled the general mood.

"Then this may *not* be a matter of just a few scientists and space aficionados. It could go on and on."

"So it seems," I answered. "Though let me correct one false impression that's going around. Only by a quirk of chance have the targets so far all been Americans. There are plenty of Europeans, Russians, Japanese and other nationalities represented on the list, just a little further down."

That brought a small murmur of satisfaction, amid the gloom. It can be comforting, when in pain, not to be alone.

"Still, *four million*. Could they really mean to hunt them *all* down, one by one?"

"I have no reason to think otherwise."

"Then appeasement is out of the question. The die is cast. We are at war."

I disagreed emphatically.

"No senator, we aren't *at war*."

"In fact, I doubt our Martian visitors know the true meaning of that word."

"But we could teach it to them, if you pass this bill."

I didn't succeed at getting the legislation killed. But they agreed to wait twenty-four hours.

It was enough.

Late that afternoon—on the third day after the landing at Cape Canaveral—another of the Martians caught up with the person it was seeking, in the suburbs of Lawrence, Kansas. Someone along the way, jumping at a chance for a little extra profit, had sold this creature a nifty little PDA with map feature and Global Positioning System, supplementing its already uncanny direction sense with good old human technical ingenuity.

Still, it wasn't exactly a surprise when the alien reached its destination. Forewarned, the news media were already there.

Though he had been alerted with plenty of time, the human quarry tried to be clever. He wasn't home when the alien showed up, but he did stay to watch from a neighbor's rooftop as a tall, green creature knocked at his front door, then broke the lock and bent over to step inside. There followed some brief crashing sounds—not exactly a rampage but an efficient search for hiding places. (All evidence so far showed that these creatures learned very fast.)

The Martian emerged, carrying a few scraps of paper . . . photos, book covers, some clippings from an album.

Standing on the front porch and turning the solar-collector wings on its shoulders to face the sun, it seemed to study the clippings carefully. Then, letting the papers fall, it stepped into the street and made a circle, scanning.

The man on the rooftop should have fled then, but he felt safe observing from the shadow of a neighbor's chimney. He would have been safe, from any Earthly

hunter.

This alien had better eyes than any Earthly hunter. Whipping out a weapon, it swiftly and efficiently shot the poor fellow, burning a two centimeter-wide hole straight through to the back of his head.

Then, almost without pause, it turned to find a helpful human—someone willing to sell information about the *next* person in a lengthy list.

Instead, within two blocks, the Martian ran straight into a vigilante mob.

This time, bullhorn warnings from marshals and secret service agents failed to keep back the angry crowd. Armed with everything from rifles to flaming torches, neighbors of the dead man approached the tall creature and began shooting.

"Damn if I'm gonna die for that thing," one marshal was heard saying as he joined the journalists, diving for cover. He had a first row seat for the spectacle that followed.

Quickly folding away its parasolwings, the Martian seemed to become a blur, charging toward the irate rabble, plunging into their midst, tossing people right and left. Cries of wrath transformed to pain and dread as people fled in all directions, many of them limping.

In moments it was over, with the Martian striding off toward a nearby shopping mall in search of somebody more helpful. A couple of dozen people lay in its wake, clutching their sides, groaning or stanching the flow of blood. At first glance, it looked like a slaughter . . .

. . . till observers soon realized—nobody had died.

It took a couple of hours for experts to study footage from a dozen cameras, scrupulously analyzing each image at slow motion. Specialists traced the source of every bullet that passed near—or into—the Martian's body. In each case, no matter which human fired a weapon, that shooter came away from the melee with an injury, while those who did not fire were unharmed. The

most accurate suffered worst, receiving excruciating puncture wounds, delivered by agile, merciless alien fingers.

Nobody died, though. And we started getting the message.

Though apparently unharmed, the Martian did not like to be attacked. For every assault, it had meted proportional retaliation. *Proportional* punishment.

"I think I know what's going on," I told Senator Green, who stood next to the President's Emergency Commissioner, watching reports from Lawrence.

"You've got to give me the next shot at making contact."

I had been making the same request for hours. This time, Green and the fellow from the White House looked at each other.

The President's guy shrugged.

"All right. Give it your best shot."

They dropped me off a block from the Georgetown Alien. We knew where it was heading because someone had just sold out the head of NASA's Advanced Projects Division—a woman whose passion for space exploration was so great that she had remained a Planetary Society member, and now might pay for it with her life. She was number fourteen on the MER List.

I stepped out of the government van, wired and bugged to the gills. The Emergency Task Force could advise me through a button in one ear, listening to every word I said.

Not that they expected much to be achieved this time. No other envoy had succeeded, why should I?

It came around the street corner at a lope, trailed by truckloads of marshals and reporters. Most people scattered as soon as they caught sight of the creature with its iridescent-green winglets always turned sunward . . . though I glimpsed several individuals lingering bravely to jeer as it passed by. One or two seemed to have longing looks, as if tempted to run alongside for a while, as we had seen on TV—offering information in ex-

change for treasure. But this one seemed purposeful, as if it already knew what it needed, for now.

Anyway, word was crisscrossing the country, ever since Lawrence. The last three people to sell information had been caught and beaten by vigilantes, while police looked the other way. So the Anti-Collaboration Bill appeared unnecessary, after all. *Ad hoc* justice was doing the job.

That made what I was about to do even more dangerous.

As the alien drew near, running straight toward me, I couldn't help flashing back to that long ago morning at the Cape. Just this Tuesday? It felt like eons—or five minutes—since I stood in shock over Bruce Murray's smoldering form.

How did I talk myself into this?

Prior envoys had tried all sorts of techniques. Blocking a Martian's path. Holding up placards. Or making formal declarations "in the name of humanity."

Instead of doing any of these things, I stepped slightly to one side. As the creature sped past, I spoke in a low voice.

"You have caused me personal injury. I demand compensation."

It skidded to a halt like some cartoon character, raising a creditable screech against the pavement and swiveling with uncanny agility toward me.

They seem superior in nearly all ways, I thought, trying not to shake. What makes me imagine I can pull this off?

The Martian towered over me, standing close enough to touch, if I dared. Those shimmering solar collectors fluttered near, looming gorgeous, like enveloping webs. Or the wings spread by some magical bird of prey.

"What personal injury have I caused you? Explain."

My larynx threatened to shut down as I flashed on the creatures' propensity for quick violence. But I managed to croak, "You must pay me for that information."

The viridian parasols flared and shim-

mered. Tilting its humanoid head, the alien appeared taken aback ... or at least surprised.

"It is not customary to pay an accuser in order to learn a grievance. If you wish to make a claim, speak."

"That's the problem, then," I said carefully. "Our customs here must be different from yours."

Talk about an understatement. But the alien did not respond. Instead, it just stood there, looking down at me.

I recalled how one of the members of the Contact Committee had described them as "super-intelligent but apparently devoid of curiosity." Or at least curiosity about matters human. Clearly it was up to me to prod a reply, or else this attempt would end just like all the others, with the visitor turning contemptuously away, hurrying about its bloody business.

"Is the concept of cultural difference difficult for you to grasp? Your culture and people must be very old."

I was guessing, of course. A shot in the dark.

"You are attempting to extract information without payment," it replied. An accusation, and true enough. But I shook my head.

"I am engaging in a sophisticated human process called conversation. Information is exchanged between individuals in larger quantities, without formal negotiation over each datum. Instead, each party maintains a general sense that information flows are roughly equal, overall ... or beneficially reciprocal."

The creature seemed to ponder for several long seconds. The photosynthetic wings drew back a little.

"This may explain why humans talk so much, in their television and radio broadcasts. Most of the content appears syntactically useless—void of practical content—except perhaps as indicator material, tracking the value exchange process itself."

"A valid presumption." Though rigid,

they weren't stupid.

"Nevertheless, the procedure seems crude. Highly inefficient."

"Yes, inefficient. And yet, there are advantages. I note, for example, that you have just made a free statement in reply to one of my own. Both of us offered information without striking a deal or trading explicit economic payments. In other words, you have just engaged in a conversational exchange.

"To the best of my knowledge, it's the first time that a Martian has done so, since you people arrived."

In my left ear, I heard an excited buzz of commentary from experts on the Contact Team, as they tried to verify this. From their encouraging comments, it seemed they were happy with me, so far. I was on a good track.

"Notice is taken," the alien replied. "I find it discomfoting to engage in a process in which reciprocal value remains so . . . inexplicit." Then, after another pause. "I voluntarily offer that commentary about my discomfort, speculating that you will reciprocate by answering a question, according to this vague custom of conversation."

"And I will reciprocate," I replied, "by attempting to answer your question . . . assuming that the question and answer are of similarly low value. Your discomfort is, after all, of little importance to me. I will not answer high-value questions without payment."

"Understood. I commence with my question. This method of information exchange—this technique called conversation—is it an example of what you call a cultural difference?"

I concentrated hard, shaping sentences in hope that the Martian would find all this interesting enough to stay and chat a while.

"It is. We have had a great many cultural differences within the human species, therefore the notion is very familiar to us. We expect even wider cultural gaps between species from different planets.

"You, on the other hand, despite your great agility and impressive mental powers, appear to find the very concept of cultural difference difficult. Even disturbing. Am I correct in concluding that you Martians have been *homogeneous* for a long time?"

Another excited buzz erupted in my ear, as our experts discussed this.

"Homogeneous. Similar. Same. Uniform. In comparison to human beings . . ." I could almost hear the synapses—or Martian equivalents—surge and grind. "This datum may be of great value to you, but I will risk that value against the vague possibility of recompense via conversation. Yes. By comparison to the young and ever-changing life forms of Earth, my species has been optimized for a long time."

"Optimized. Hm. For how long?"

Tension seemed to fill the tall body in front of me. This was clearly excruciatingly difficult, grappling with concepts long taken for-granted.

"You have asked two consecutive questions. Nevertheless, I shall answer.

"Optimization at near-perfection occurred two-hundred and thirty nine million of your years ago."

The noise in my ear was positively painful as members of the Contact team reacted. Surprise. Consternation. But above all joy that at last something was being learned.

So far, my handlers seemed happy with the way things were going.

I did not expect that to last.

"Now answer a question of mine," the Martian said. "Explain to me how this method called 'conversation' will help me to achieve my goal on this planet."

Damn if this guy wasn't single-minded.

"That question will be difficult to answer without knowing more about your goal. You appear to have come to Earth with a mission to kill people. I assume you have some grievance against those who were listed on the disks that were carried by the Mars Exploration Rovers."

Silence. I tried again.

"You make no accusation against these people when you kill them, so accusations are optional. You only accuse when you want compensation, by payment of some value. But the only thing that Earthlings seem able to pay with is their lives. We don't have anything else that you want.

"So this is all about *revenge*, isn't it? Revenge that's direct. Personal."

The Martian took one step back. The parasol wings flared again.

"Instead of answering my question, you have posed a question of your own."

"B-but I'm just trying to narrow down how to answer. In conversation you first clarify—"

"Human style conversation appears to have no value. I will end this experiment in twenty seconds."

Desperation filled me. Clearly these creatures communicated with each other—buying and selling information by radio or some other channel our experts hadn't found. If I failed in this attempt, word would spread among Martians. Perhaps no other would stop to chat, ever.

A few blocks away, the next phase of this tragedy was already under preparation, as men with heavy weapons made ready to intervene with deadly force, the next time an American citizen was killed. Driven by rapidly shifting public opinion, momentum was building toward war.

I couldn't let it come to that. During the last urgent seconds that I had the creature's attention, even as it started to turn away, I quickly pulled out a paper envelope and blurted—

"You may be right about conversation. So let's make it a business deal, after all.

"I have here the locations of the first hundred people on that list. Up to the minute. You could sell the info to your fellow Martians, sorted geographically, so they can hunt more efficiently than before.

"Moreover, I can show you how to

keep getting such information, evading all attempts at interference."

The screech in my left ear was so loud that I had to tear out the button-speaker. I guess I must have exceeded my official authority as a negotiator.

The rest of the monitoring gear followed, crushed under my foot as I watched the alien carefully.

It opened one of those seamless flesh-pockets, dipping into the limitless supply of nuggets and diamonds . . . but stopped when I waved a hand. The Martian seemed to comprehend my gesture of refusal at once. We had gone beyond such trifles.

"State your price," it said.

Time passes quickly when you're having fun.

I lay on a cot, tasting blood through the broken stumps of two teeth, when word came to my jail cell that the first of my payments had arrived.

Wages for selling out a fellow human, a fellow American. The first of a hundred. Possibly many more.

"We weren't able to move everybody in time," Senator Green said when I was finally dragged before the Emergency Committee. "Three more were killed in the last hour. Thanks to you."

He expected an answer, but I had learned from the Martians. Conversation is inefficient. Any comment that I made would be superfluous.

"We fixed the mistake that let you access the protection database," said the President's representative. "The location of threatened individuals will be more secure."

I shrugged. "If you say so."

"We *will* protect our citizens."

That roused me a bit, in curiosity.

"How? By hiding four million people? By fighting?"

A general pounded the table. "If necessary, yes! They must be taught to respect us. Our laws and our lives."

"Very stirring," I answered. "How's that going?"

The general flushed without answering. No need. In my cell I'd watched TV footage from the slaughter in Seattle, when a National Guard armored company fought in the streets with heavy weapons, battling to protect a billionaire bookseller and space aficionado from a single lanky alien. This time, the Martian departed the *Battle of 12th Avenue* with a temporary limp . . . quite an accomplishment . . . though several tank crews died to achieve it. Along with the prominent book dealer.

Proportional punishment. Twenty brave men for one briefly inconvenient wound.

"I hope you at least took my advice about badges," I said, wincing as one of my broken teeth twinged.

The general glowered. But Senator Green nodded. "The soldiers wore no identifying markings. You still haven't explained why—"

"Why we should take advice from a collaborator and accomplice in cold blooded murder?" interjected the fellow from the White House. His attitude reflected a keen political sense of rising public will. The beating I received upon being arrested was a mere taste of what would happen if I were released onto the street. Vigilantes would spare nothing larger than a hangnail.

"Why listen to me? Maybe because I'm the only one who seems to have a clue what's going on."

This time, the whole Committee lapsed into sullen quiet. You could scoop their hatred with a shovel.

"So." I broke the silence. Somebody had to. "Will anybody explain why I'm here? Why did you send for me?"

"Wait," I continued, holding up a hand. "Let me guess the reason.

"They keep their word. They honor their debts.

"I've been paid."

Tight-lipped, grudgingly, Senator Green nodded to an assistant, who turned on a fancy live-access screen nearby. "A new web site appeared on the

internet, twenty minutes ago. We can't trace the source. It contained only this video clip."

The screen flickered—a glitch at our end, I figure, since Earthling network technology would seem trivial to these ancient, advanced beings. When the static cleared, there stood a creature from another planet. One whose brain and form had already been "optimized" before our ancestors split off from dinosaurs.

It spoke rapidly and with characteristic efficiency—haloed by the iridescent-green fans, or wings, that fed it directly from the sun.

"The assistance proved helpful in accomplishing my immediate goal. I have also benefited by selling updated location information to others of my kind.

"Despite this, some hunters report being inconvenienced by the clever evasiveness of those they seek. It appears increasingly likely that targets are being aided by other humans.

"I wish to know more about non-listed humans who interfere. I will pay for information about them. Their reasons for interfering. And for assistance adding their names to our List."

This was my first time watching the video. Everyone else in the room must have already seen it, many times. Even so, that last sentence drew a murmur of dismay.

"If you can help to identify those who interfere, contact me using the code words that you established," the Martian continued. "Meanwhile, the assistance received so far has proved valuable. Hence, I will now pay the first installment of the agreed-upon price."

I felt tension all around. Despite grueling interrogation, I had refused to explain what passed between me and the alien that morning, after I tore off the monitoring devices.

"You asked specific questions, requesting that I post answers on the crude planetary network. I deem that your help so far merits three answers. I

will post more if success continues to result from your assistance."

In other words, further rewards would flow if the envelope that I handed over, early this morning, helped aliens to murder even more people in a long chain.

"Question Number One. Why have I come to Earth—a barbaric and unpleasant place—in search of human beings to kill?"

"Answer. As you surmised, the motive is vengeance—a concept which human beings appear to understand, though in a typically gross and primitive manner, absent all subtlety, persistence, esthetics or depth.

"Someone of great importance to me died as a direct result of the arrival of a Mars Exploration Rover. Under the Calculus of Reprisal, I seek redress from those responsible. I shall exact payment from a sufficiently large number of humans to restore balance. At present that figure is eighty-nine thousand and seventy three—subject to change."

It was my turn to gasp, at the appalling number. Was that how small we seemed to them? Intelligent enough to be held accountable, yet not worthy of conversation. Bright enough to be punished, but only satisfying in large quantities.

One solace. Whatever calamity had come to Mars on that space probe, inadvertently wreaking harm—perhaps some terrestrial plague that took them by surprise—it did not slaughter *millions* as I had envisioned. Just forty, possibly fifty, or so of those ancient ones must have died. Maybe the same number as our invaders. Did each one come to avenge a single—loved one—by leaving a bloody swathe of dead humans?

The creature held up two fingers—an eerily humanlike gesture.

"Second question. What form of cooperative enterprise constructed the interplanetary vessel that brought me here?"

"Answer. Our craft was built by a collaborative association of the aggrieved.

Sharing nearly identical motives, a number of us gathered—using ancient and long-dormant skills—in order to cross space, achieve vengeance and restore balance. Such collusion is distasteful. But imperative need overcame natural aversion.

"It has become apparent to me that Earthlings form collaborative associations with disgusting readiness, and hew to those associations rigidly. Like the association of four million that sent the deadly Mars Exploration Rover. This cultural difference merits study. I will pay for further information about—"

"Stop!"

At my shout, the assistant tapped a key to freeze playback. Onscreen, the Martian remained motionless, warped slightly by video clutter.

"As I feared," I muttered. "We're in trouble."

Senator Green shook his head. "Now you say that? Or do you mean things are even worse than we thought? How do you conclude—"

"Never mind that!" the White House Guy growled. "We want to discuss the *third answer*."

"Third answer?"

"The *next* one. Where the alien offers a few sentences about their *space drive*. That's the important one. Our physicists are all in a lather over what it says about *vacuum energy* and *neutralizing inertia*. A hundred theories are spouting all over the place, with no idea how to sort them out!"

I shrugged.

"Well? What did you expect, detailed blueprints? A few sentences were all I had earned."

A murmur of disgust greeted the word. *Earned*. Yet they clearly felt torn, these men and women who were charged with finding a solution to humanity's worst crisis. I sympathized. But only to a point.

"If you want more hints—maybe even blueprints—I'm sure one Martian or another will sell them to you."

"Sell them . . . you mean like the way *you* bought these answers? Never!"

I felt too fatigued even to shrug again. "If you won't, then somebody else will, now that there's a more convenient way to do business with them. Frankly, I think we'll get a better deal if we do it carefully, in small stages, keeping the price high. Play them off each other . . ."

"You're talking about selling these invaders the lives of human beings!" shouted the general.

"In exchange for knowledge we desperately need. Yes. To race through a quarter billion years of catch-up. Call it a *reconnaissance* with moderate expected losses, General."

"Why, I never heard anything so monstrously—"

"Pragmatic?" With a sigh, I straightened, pulling my shoulders back. I had to try to get through to these people. If only in order to persuade them to send me a dentist.

"Senator, ladies, gentlemen, we need to ponder our own past. Especially when European sailors and settlers arrived in Africa, Oceania, the Americas. Few native peoples came through first or second contact very well. Many perished. And our differences then were nothing compared with the gaping chasm that separates us from extraterrestrials.

"Who managed best, among our ancestors facing those European strangers? Everyone suffered, but a few did better than average. The Japanese and Thais kept their independence and strove at great cost to catch up. The Cherokee and Iroquois carefully studied white newcomers, learning and borrowing whatever seemed to make sense.

"And yet, in our movies, books and modern myths, it is always the most obstinate tribes who are portrayed as noble, admirable, clinging to every aspect of their old ways, defying the clear need for flexibility, for adaptation. If we follow their example—proudly sticking by our own standards and customs, no matter

what—we may *nobly* follow those tribes into extinction."

Amid the glowering faces, one woman—an anthropology professor I had met years ago at a conference—spoke in a voice deep with gloom.

"Many of us already reached that conclusion. The debate now is whether it will be *better* to go extinct, than do as you recommend. What good is surviving, if we pay with our souls?"

I nodded. "Our ancestors must have had similar conversations, in hogans and wigwams, in countless huts and palaces, from Lapland to Australia. It's an old story. Western civilization was luckier than most. But our luck has run out.

"I'm just glad it's not my decision. You leaders—and others like you—will make the call. I've simply laid out the choice, stark and bare."

"That you've done, sir. Ruthlessly."

"Judge me later," I snapped. "When you know all the facts. It's humanity that matters now. Not individuals, or nations.

"Anyway, do you honestly think you can protect the people on that list? Say you do finally succeed at killing one of these creatures. Won't that bring *more* Martians, seeking countless *more* human lives to atone? Ask Native Americans how well that math added up."

The glum spell that followed was punctuated by a sound I made sucking at one of my broken teeth. I couldn't help it, really, though it seemed disrespectful.

In fact, part of me felt *glad* that these people were so unlike the pitiless cliché authority figures of cinema. Instead, they seemed motivated by the highest values. Human values.

In my own way . . .

Senator Green spoke again.

"You don't seem curious about the answer to your third question."

"Should I be? A technical issue. Thrown in to interest scientists, the military. To show the Martians are so far ahead, they'll casually trade information we find precious. Like the Dutch, buying

Manhattan Island for beads. It may take a great many such answers before we begin to know *how little* we know."

"Hm. And you've set it up so that now the aliens can trade information with treacherous humans via the internet."

"As if someone else wouldn't have done so, within hours. Even if you shut down the Net, that won't matter. They've learned not to offer baubles anymore. Nobody will sell out a neighbor for nuggets and gems that can be seized by police, or vigilantes. But how about a new industrial process? Insight to disease? An advanced machine or weapon? I've shown that information can be swapped without personal contact, using some personal code words.

"Soon, others will catch on. How to get a few sentences of useful data from creatures who are eons ahead of us. You can't hide four million people from that kind of temptation. And now that the list is growing longer—"

"Longer," the general mused. "They add names of those who try to thwart them. Those who help the four million. Is that why you advised us to remove all badges—"

"It's worse, general. Much worse than that. Haven't you wondered why they came after *just* people on that Mars Exploration Rover list?"

Committee members looked at each other before turning back to glare at me. But I only felt the frozen presence on the big screen. Tall, enigmatic, impervious and almost perfect. *Optimized* so very long ago that its kind craved the warmth of no hearth, nor even atmosphere. So perfect that it made its own food, living in almost pure autonomy, scarcely needing any other.

How jealous I felt.

"What do you mean, worse?" the anthropologist finally asked.

"I mean that they seem not to comprehend how interdependent, cooperative and gregarious humans really are. We're individually so weak, so soft and frail, that we evolved these tendencies.

We aggregate into large groups as a natural part of being what we are. Who we are."

"So?"

"So, the notion of *permanent* associations—including nations and states—may be the most alien thing about us, from their Martian point of view. They do know we're 'disgustingly' cooperative. When they examined the MER probe and found four million names, they naturally assumed that it was sent by a great big temporary consortium composed of those who *signed* the spacecraft—"

"You mean that's why—"

"—so that's who they've come to kill."

"So it's all a mistake! What if we explain these are innocent people. Space fans. Sci-fi readers. They aren't responsible!"

"Then who *is* responsible, Professor? Who sent *Spirit*? Who sent *Opportunity*, and caused the death of fifty Martian demigods?"

"Why, NASA did."

"With funds provided by—and representing—"

"Representing? Why, the people of the United States of Am . . ." Her voice trailed off.

This time, the silence stretched on and on. Finally, I turned away. Accompanied by two guards, I retraced my steps, back to the jail cell and my thoughts.

I won't stay here, of course. They can't hold me.

Things are moving fast and decisions will be made.

Perhaps they'll be pragmatic, as the Japanese were during the Meiji era, doing whatever it took to catch up with the West as quickly and systematically as possible. The logic is impeccable, after all. If those on the MER List are doomed anyway, perhaps we can get a best possible deal by doling them out to the aliens slowly, one by one, in exchange for information.

Buying lessons that we need to sur-

vive.

Or maybe our leaders will embrace the other course—one praised in legend and film. The noble path taken by so many of our ancestors when they faced similar choices—to go down fighting. Defending our customs and ways. Our fellow citizens. The innocent. Whatever the cost.

There are good arguments for choosing either course. Though judging from those people in the Committee Chamber, I'll bet on nobility winning over pragmatism.

How ironic that movies nearly always depict generals and statesmen as cold-blooded. Viciously practical. Perfect villains. But everyone in that room had been *raised* by the same films and legends. Underneath our modern-cynical gloss, most of us are romantics. Generous. Courageous. Capable of great sacrifice for other members of the tribe.

I admire it. Of course. I'm built the same way.

My sacrifice—for the sake of the tribe—was to disagree. To point out the other option. Maybe they'll realize it soon.

Anyway. I'm glad it's not my call.

Oh, the Martians aren't stupid. They operate under different assumptions, true. But soon—especially if we fight—they'll start to grasp how revoltingly gregarious humans really are. They'll figure out that 'laws' and 'nations' aren't just words that stand for temporary group-contracts, but powerful chains of obligation. Bonds that penetrate our tissue, bone and sinew.

Nor will it stop at the American border. Twenty nations contributed instruments to MER. And when you get down to sub-components ...

Will *any* of us survive, once they realize that *all* of us are responsible?

As dark night settles through the narrow window of my cell, I squint at shadows, trying for analogies—the straws that a human mind clutches, when try-

ing to fathom the strange. These Martians are like bears, I figure. Powerful, autonomous ... needing little from each other or the environment ... coming together only for special transactions, like mating. Ultimate libertarians. Damn.

From their perspective we're like ants, almost hive beings. An unpleasant image for one like me, raised to treasure individuality.

I envy *and* pity them. No perfect Martian will ever face the conflicts that roil me now. The regrets. Or the poignant satisfaction, knowing I'll be forgiven.

Somebody had to do what I did. Be the required Judas. Offer a second option, whether or not it's chosen. The bitter, pragmatic way.

It could only be someone with a number like mine—one hundred and twelve on that list.

Awaiting my turn, I keep hoping one thing.

Get a good price for me.

No handful of beads. Make it something exciting, useful and interesting, like so many of us yearned to see from the space program. The reason we pooled so much human talent and enthusiasm, reaching for those lights that our imperfect eyes and caveman brains could barely make out, twinkling overhead.

If my death—and several million more—will bring us closer to the stars, well, okay. I don't lament signing my name to a roll call of dreamers.

When our human descendants get "optimized," will we turn our backs to the sky, as the Martians have? No way. We won't abandon curiosity. Or each other.

I hope.

Can't rest or sleep. I keep looking up, each time there's a noise beyond the dark window. Waiting for my own monster to come in its patient way, with the appearance—and godlike persistence—of some ageless, avenging angel. Come to spread its dark wings over me and

collect my small value in vengeance, before moving on.

No battle this time. They won't try hard to save me—the soldiers, scientists and politicians charged with protecting humanity's future. Whichever course they choose—pragmatism or noble resistance—few will mourn my turn, I guess.

No matter.

Just get a good price for me.

Make it something cool. ■

This creepy 'campfire story' was begun the very night that Mars passed closest to Earth in 50,000 years—during the October 2003 'planetary opposition.' It is too late to remove names or add them to MER ... they will be on Mars by the time you read this. But the author invites you, if you dare, to join him in signing on for the next space probe. Take part by joining the Planetary Society at <http://planetary.org>

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75 YEARS OF ALTERNATE VIEWS

The 75 in the title does not refer to the number of years that *Astounding/Analog* has been publishing Alternate View columns. These came about shortly after Stanley Schmidt took over editorial duties from Ben Bova in 1979. In the "In Times To Come" from April of '79, Stan said this about The Alternate View: "What we (*Analog*) haven't had is a science news column, regularly reporting and commenting briefly on developments sometimes too new even for our articles. 'The Alternate View' will be such a column" (The astute reader will no doubt note that this very column is not about new science.) With the very first appearance of The Alternate View in May of '79, Stan said: "Herewith begins a new department, wherein G. Harry Stine and Jerry Pournelle take turns reporting on very late developments in science and technology. This month, a new angle in man-computer cooperation ..."

Stine's first column did deal with bio-cybernetics, but it was hardly a report on something "too new even for our articles." He'd found some interesting tidbits in an unclassified DARPA document under the heading of "accomplishments," including a paragraph about bio-cybernetics, and he ran with it. Pournelle's first column the following month didn't deal with late developments either. Instead, he wrote an editorial bitching (as only Jerry can do) about how the scientific community could get together to attack Velikovsky, and that it could switch its annual meeting from Illinois

to Texas because Illinois hadn't passed the Equal Rights Amendment, but that it couldn't get together to protect SETI from being Proxmired, nor voice its insistence that the presidential science advisor on the subject of nuclear waste should be a non-idiot.

So right from the beginning, Alternate View authors have had an alternate view about just what it is The Alternate View is supposed to be about. It was only when current columnist John Cramer took over from Pournelle that one could reasonably expect that, half the time, The Alternate View would actually be about fairly late-breaking science news, or at least, physics and astronomy news. By the time I took over from Stine, he had established that an Alternate View column could be damn near anything the author wanted to write about provided it had some kind of connection, no matter how tenuous, to science, technology, or science fiction. And, oh yeah, Stan Schmidt has to approve. ~

In my case, since I was replacing Stine, I wanted to follow in his footsteps as closely as possible, which is one reason why my Alternate View columns are so different from Dr. Cramer's. But Stine had very large feet, and took very long strides. Thanks to reader Steve R. Hastings, I have in my hands a copy of Stine's *On the Frontiers of Science*. (1) Therein, Stine describes his experiments with dowsing, pyramid power, "wish machines," and other assorted weirdities. In short, old G. Harry was even more open-minded than I am. Most of the things in

his book I would never look at twice, except that the monkey in me is curious, and since Stine says he got positive results, no doubt some day I'm going to have to try these things for myself.

The reason I said "75 years of alternate views" is because this column is appearing in the 75th anniversary issue of *As-tounding/Analog*, and right from the start, the magazine was publishing alternate views on matters of interest to SF folk long before the actual column debuted. Granted, the earliest issues weren't the hotbed of controversy that came about with the Campbell years, but even if only science fiction appeared in those pages—well, you can't even write SF if you don't have an alternate view from the mainstream of average Joes.

And once Campbell came along, the world changed. Campbell himself had an alternate view of what SF should be when he took over the magazine in the late 30s. By the 40s, his alternate view had become the mainstream one which, I believe, helped lead to the current suffusion of the SF mindset into today's culture.

Apart from SF, Campbell liked to champion all kinds of interesting, weird, flaky, and far-out ideas. Most readers are at least somewhat familiar with some of these. Dianetics is probably the first one that comes to mind. Others will recall the Dean Drive or the Hieronymous Machine. The first of these took on a life of its own (just ask Tom Cruise). The other two also still have people supporting the claim. Personally, I don't for one second believe the Dean Drive worked, though it may have been able to do some fairly counterintuitive things since it was a highly nonlinear system. As for the Hieronymous Machine—well, Stine has plans for the damn thing in his book, so I may give it a try.

During Ben Bova's stint as editor, he put together the "Special Velikovsky Issue" of *Analog* (October, 1974). Along with a number of stories dealing with

the theme of "what is truth and how does one determine it" were two essays, one speaking in favor of Velikovsky by Frederic B. Jueneman, and one speaking against by none other than Isaac Asimov—that is, a pair of alternate views. It's amazing how much of what was said by both authors still resides in my soul though I first read the essays when I was but fourteen.

Jueneman took the scientific community to task for its unfair treatment of Velikovsky. One editorial comment he made in his essay bears repeating here since I, having gained an additional thirty years of experience in science since reading it, am convinced it is true. He said: "The purveyors of the conventional and accepted views of science state their cases very well. Their description of the scientific method is delineated in precise terms that grasp the essence of scientific inquiry very well, as indeed it should, for these spokesmen have had considerable practice in distilling and refining their rhetoric, and in so doing win approval of their colleagues and peers. And, of course, do a beautiful snow-job on uninitiated undergraduates and the nonacademic community. Well-rehearsed biases, when mixed with an array of facts, reflect a most plausible picture." (Pg. 30) Regardless of how one feels about Velikovsky, this is a useful bit of wisdom to keep in mind when evaluating other scientific accepted wisdom, especially when others with alternate views come along.

The Asimov piece is not, unfortunately, Asimov at his best. He called his essay "CP," (the initials being a neutral term for "crackpot"). He then went on (with exactly the sort of smug, know-it-all tone that makes ordinary people *want* scientists to be wrong) to disparage so-called crackpots in general, but sometimes landing a blow or two on Velikovsky. It is amazing now to read this and note that the Solar System as we know it today, with its host of battered moons and planets, is much more like the "worlds in

collision" view pictured by Velikovsky, than the clockwork mechanism Asimov learned about in school.

Ironically, near the end of his essay, Asimov says, "Over the follies that are leading mankind to destruction through overbreeding and through the continuing rape of our lovely planet, I can do nothing but weep." So in an essay in which he decries people believing in bullshit science, he himself apparently believed in the trendy, 70s era, overblown doom-and-gloom claims supported by what we now call junk science.

Some of the alternative views on things put forth in *Analog* science columns were highly influential on the course my life would eventually take. One of these is "The Curious Case of the Humanoid Face . . . On Mars" by Richard C. Hoagland in the November, 1986 issue. This controversy remains alive today. Now, I'm not going to say I think the Face is a humanoid face, although I have tried to keep my mind open about it. But that particular article so captured my imagination that I decided to look more deeply into the matter. Along the way, I discovered that a whole bunch of "facts" either aren't facts or are only facts under certain circumstances or given certain assumptions.

Having learned that, I began to get my own hands dirty in wacky-ass science. You've seen some of it in these pages. Hoagland led me to Tom Van Flandern, some of whose work on gravity I discussed in my own fact piece "Paradigm Shifty Things" (*Analog*, June 1997). This led to a debate between Van Flandern and General Relativist Steve Carlip via my e-mail address, and I discussed it at length in my double Alternate View "The Great Gravity Debate" (September and November 2001).

That same fact article also dealt with some work done by Dr. Peter Graneau. His friend Dr. Tom Phipps sent me a letter about that, which resulted in a long period of friendship and correspon-

dence, and ultimately, in my working on something called the Marinov Motor. And that, too, I discussed in a two-part Alternate View called "The Marinov Motor and Me" spread over the February and April issues of 1999.

The papers that Dr. Phipps and I wrote about our researches on the Marinov Motor came to be published in *Infinite Energy Magazine*. Those articles, my scientific background, and my writing experience led editor Gene Mallove to hire me to be associate editor of *Infinite Energy*, and to run his New Energy Research Lab. At the time, *Infinite Energy* was mostly a cold fusion magazine. Cold fusion was Mallove's passion, and he wrote about it in perhaps the most extensively referenced fact article to ever appear in *Analog*, it being "Cold Fusion: The 'Miracle' is No Mistake" in the July/August 1997 issue.

Sadly, I must report that a few months before writing this column, Gene Mallove was murdered at his boyhood home (he was using it as rental property), apparently as the result of a robbery. Ironically, the murder happened only shortly after the Department of Energy decided to reopen the books on cold fusion in light of the research that has been done (and ignored by the bulk of the mainstream scientific community) since 1989, and often reported on in *Infinite Energy*.⁽²⁾ Some think there may have been more than coincidence involved in the timing of Gene's murder (Richard C. Hoagland has suggested this as a possibility, though I don't know if he thinks it is *likely*), but I highly doubt it. It was just the darkness of life snuffing out a candle to make the world a little darker.

In researching this piece I went through many back issues of the magazine. I'm astonished at how relevant and downright prescient so many of the "alternate views" presented are. The very first *Analog* I ever bought, the September '73 issue, had a fact article dealing

with using hydrogen as a fuel for cars, an idea finally coming into its own. The same issue that held Hoagland's Face piece also had Cramer's Alternate View dealing with his own Transactional Interpretation of Quantum Mechanics, an idea that has steadily gained favor ever since.

And in my case. . . .

Echoes of my Marinov Motor work show up in my story "Nova Terra," which is in this very issue. At the end of part 2 of my Marinov Motor article, I made it clear that I did not understand how it

worked, particularly the variant I called "The Warlock's Wheel" which flagrantly violated Newton's Third Law. During my time at *Infinite Energy* I started to figure it out, and now understand how it works quite well. I just haven't told anyone.

Perhaps it's time I did. ■

1. *On the Frontiers of Science* by G. Harry Stine. Atheneum, New York, 1985. ISBN 0-689-11562-8

2. Wilson, Jim, "Dangerous Science," *Popular Mechanics*, August 2004, pp. 74-79.

Civilization is the progress toward a society of privacy.

—Ayn Rand

Sometimes it's worse to win a fight than to lose.

—Billie Holiday

Nova Terra

Jeffery D. Kooistra

A little ignorance can be bliss—rather like an itch,
provided you can scratch. . . .

Mike and I had been friends from boyhood, during wildflower-scented summers, when we would catch bumblebees in old mayonnaise jars off the purple blooms. There was no reason for this other than it simply being what boys did. Mike's yard had a maple tree and we would climb it and talk about life.

"I'm going to be an astronaut," Mike told me from his branch. They went to the Moon the first time that summer.

"And I will be your engineer," I said from mine, though the image in my mind was of a steam locomotive with warp nacelles—a mixture of the *Enterprise* from *Star Trek* and the train from *The Wild, Wild West*.

Time passed as it does for all boys. They went to the Moon a few more times, but Mike didn't go, and by the 90s it was clear he never would. I became an engineer, though not of trains, nor of starships, but of meso-scale electromagnetic machines—mostly motors the size of a two carat diamond and smaller. I also married, fathered two girls, and put them both through college.

Though not into space, Mike did get to travel, having joined the Foreign Service

out of the Air Force. The Eastern Bloc having fallen, there was cleaning up to do. He sent me letters from Poland, East Germany, Romania, and Tuva somewhere in Siberia, this last only a handful of months before.

But I heard about his death from my mom, she having heard it from his mom, crying over the fence separating our boyhood backyards.

How strange it felt to open the letter from him that landed in my office mailbox two weeks later. It was from North Korea, that mysterious, closed country that had finally been cracked open in the recent war.

I tore open the envelope. Three sheets of paper. One was typed—both sides, single-spaced—it seemed on an old typewriter that dropped its "y's." Another was a diagram drawn in Mike's crisp hand, crammed with notes in the margins and on the back. The last, a map with Seoul at the bottom. The letter was dated July 18th, two days before he died.

I read the letter. I read it again. What the hell was this all about? Who was Ehrenhaft? What was "hidden momentum?" How did North Korea figure in?

I scanned the map. There was a little

"x" near a road by a town spelled in an unpronounceable arrangement of English letters near the top of the map. "Right here," the x seemed to say. That, at least, was clear enough.

I looked at the diagram. Printed neatly across the top: "If you don't believe me, build this!" It was some kind of motor that couldn't possibly work.

How typical of Mike.

Mike was never content with science as found in the books. With him there was always some other angle. He never believed that cold fusion was dead. He once visited Finland to look into the anti-gravity disk nonsense that had popped up in the 1990s. Many an evening, over scotches, we'd talk about where we'd been and where we were going, and I recall him saying, "Wes, old buddy of mine. I know you think I'm crazy when I tell you that the science written in our books is not the science written in the Universe. But I've been around more than you, and looked into some pretty dark places where the light isn't supposed to shine. I've learned more deep secrets than I could ever have wanted to know, and the best I can tell you lest *they* come and shoot me is that a great deal is amiss in this world. From our minds to our science to our supposedly known history, we've got so blasted much wrong!" But that was after three shots, and I'd always pour another, for after four we'd sing to the wee hours.

God, how I missed him!

I was going to put the pages back into the envelope when I dropped the one with the motor diagram. A wind from the air conditioner caught it and smoothly wafted the sheet into the space between the wall and the file cabinet. Before I could get it the intercom blared and Joyce the receptionist said, "Mr. Carl, there are two men on their way to see you. I couldn't stop—"

"—them." I finished for her as my door burst open. The two men were dressed in dark suits with conservative ties. One fulfilled the expectations of stereotype by

wearing dark sunglasses. The other smiled at me, whipped out an ID badge. They were AFOSI, the Air Force Office of Special Investigations. "You received a letter today from your old friend. We need it." He stepped forward and snatched the letter out of my hand before I could protest. He glanced at it, made sure it was the letter from Mike, asked, "Did you read this?"

"I skimmed it. I only opened it a couple minutes ago, uh, mister. . .?"

"I'm Agent Rogers, he's Agent Smith," he said, nodding his head toward the other as he looked at the letter more closely.

The one with the shades said, "It really is 'Smith.'"

Agent Rogers finished with the letter, scoped the map, then put both back in the envelope. "Good," he said. "Mike was careful not to endanger you with too many specifics. I don't think we'll need to bring you with us. Still, best not to tell anyone what was in this letter."

"Then why did Mike send it to me if it was such a big secret?"

"I can't answer that," Rogers said. "I'm sure he had his reasons, but he was killed. That leaves a lot of loose ends to tie up." He handed me his card "just in case." They started to leave. Smith was already out the door with Rogers right behind when the latter stopped and looked at me. In his eyes I saw a hint of shared pain. "We lost a damn good agent and I, like you, a damn good friend." And then they were gone.

I didn't have time to sit down before Joyce came in. "I'm so sorry about that, Mr. Carl. But they wouldn't listen to me."

"It's okay. No harm done," I assured her. "They're AFOSI. They didn't have to listen. Still, wasn't very polite."

Once she left, I did sit down and pretended to work at my computer, but all the while I was thinking about the diagram that had gone unclaimed. I was glad I'd been able to stay cool enough not to volunteer to them that there had been a third page. Perhaps I was being overly paranoid, but I decided not to retrieve

the diagram until later lest *they* be watching me through the window. By early afternoon the sun would be shining in my window. That would be the natural time to pull the shades. Then I could get the diagram....

I couldn't help but spin plots and counterplots and countering subterfuges in my mind. I also thought about Mike. So he hadn't quite left the Air Force after all, not if he'd been an AFOSI agent like Rogers had said. AFOSI have a broad mandate: "AFOSI identifies, investigates and neutralizes criminal, terrorist, and espionage threats to Air Force and Department of Defense personnel and resources." It says that right on their website. So that's what Mike had really been doing while traveling around the world.

Later I went to lunch, returned to find sunlight flooding through the window, closed the shades, and then grabbed the diagram and shoved it under the stack of papers in my briefcase without looking at it. Whether my cleverness paid off or simply because I wasn't being watched, I went home that night without anything else happening to me.

My wife was out shopping when I arrived home. Eve and I had lived in the same four-bedroom house with our daughters for twenty years, ever since the girls were six and three. The house had seemed large when we'd gotten it, then small as our daughters entered their teens, then large again when they were both away at college. Vicki, our oldest, had married her college sweetheart; Jana, the "baby," was traveling abroad. Though we still kept their bedrooms much as they'd left them, I had turned the fourth bedroom, which had evolved into a large extra closet over the years, into my personal office and workshop. Therein I kept my technical books, my own "don't you *dare* touch" computer, and various and sundry electronic parts, machine tools, test equipment, and catalogs.

It was to the office that I went as soon as I changed into more comfortable

clothes.

I rifled through the papers in my briefcase until I found the motor diagram, took it out and looked at it more closely. "Impossible," I muttered. "This thing can't possibly work."

Motors were my specialty. More than that, they were my obsession. Making tiny motors, the kind that the DoD puts in gnat-sized, spy-plane millibots, is both an art and a science. A motor suitable for a washing machine when scaled down might be entirely wrong for something four orders of magnitude smaller. Even if a scaled-down ordinary motor would work, it certainly wouldn't be an optimum performer. In the course of looking for creative solutions to millimotor problems, I'd often sought inspiration from the patent office. Over the years, inventors had come up with thousands of different motor designs, some of which actually worked better on the mesoscale than they would have at normal size. Suffice to say I knew more than my share of tricks when it came to motor design, and this *thing* that Mike had diagrammed just couldn't work as a motor.

It was a permanent magnet design, with brushless commutation. But the magnets were oriented in a useless way on the rotor, and the stator didn't even have poles. Mike had also specified special materials in places where it couldn't have made a damn bit of difference, and the indicated shape of the drive waveforms was simply bizarre. Still, Mike had packed a great deal of detail into this diagram—it would take a while to fully analyze it all. And those agents had certainly thought Mike's letter important.

I never heard Eve come home. She surprised me in my office. "I see you neglected to fix yourself supper, again," she scolded.

"Oh, sorry," I said. "I got—"

I was going to tell her about the letter from Mike, but then recalled the admonition from Agent Rogers. "I mean, I came across something interesting today and I'm just trying to figure it out."

"Well, you can't do it on an empty stomach. I'll get you a sandwich. Is this going to be a 'pot of coffee' night?"

I smiled at her then looked at the diagram again. "Sure looks like it," I confessed. "Thank you, dear."

I went to work as usual the next day, but by eleven o'clock finally accepted that I was worthless as far as my job was concerned. I'd stayed up until after 2 A.M. looking at the motor diagram, then hadn't slept well when I finally did get to bed.

I packed up my briefcase and left the office. "Joyce," I said on the way out. "If Eve calls, tell her I went to visit my mom. I should still be home by dinner, and she can reach me on my cell if she needs to."

It was a bit more than an hour's drive to mom's house up in Grand Rapids. I didn't mind. I needed time to think. I didn't even take the highway, but stuck to country roads. The sky was deep blue, populated with puffy white clouds, and the cornfields were their richest August green. I waved at the cows like I did when I was a kid, and once or twice at a farmer as I passed him driving his tractor along the shoulder of the road. Something inside me craved familiarity, and seeing countryside unchanged since my youth helped satisfy the need.

I needed to know more about Mike, his job, what he really did. I needed answers to questions that I now could never ask him.

I called Mom to let her know I was coming when I was fifteen minutes away, so she had coffee brewed and three kinds of cookies waiting by the time I pulled into the driveway. We settled down at the kitchen table. "This is a nice surprise, Wes," Mom said. "You don't come over enough. And I don't think I've seen the girls or Eve since Christmas."

"I know. I'm sorry. You know how it is."

"Yeah. I know. It's been like that for a long time. So why did you come? It's about Mike, isn't it?"

"Uh-huh. I need to find some things out. I'm hoping Clara can tell me." Clara

was Mike's mother. "How's she doing? Have you seen her in the past few days?"

"She's holding up as well as can be expected. Mike was home even less than you are, so at least her daily routine hasn't changed. That's important for old folks like her and me. I think she'd like to see you. The other day she asked me how you had taken the news." Had Mike had a funeral, I would have of course been there, and she'd have known. But Mike's dad was long dead, and he'd had no siblings, no wife and kids of his own, and what with Clara being an only child herself, and Mike's body unavailable for laying to rest—well, Clara had just decided there was no point.

I took a last swallow of coffee and set off to see Clara, taking the same path I'd taken so many times as a kid. Out the back door, through the backyard, through the gate in our fence and along the chain link fence of Mike's yard.

I walked over the spot where I had broken my arm forty years before. It had been a rainy day. I was running home from Mike's with my shoes untied, slipped, came down on my left arm just right to fracture the forearm right in the middle. Just before going to the hospital, I insisted on calling Mike to tell him what happened.

He didn't believe me.

Clara started crying when she saw me at the door. Through her tears she told me to come in. I did and I gave her a big, long hug until she could stop sobbing. She felt so tiny, and looked so faded. Finally we sat down in her living room, the very place where Mike and I watched reruns of *The Brady Bunch* after school.

"You were always Mike's best friend," Clara said. "He got to know a lot of other people. Even some real important people. He got to know a couple of the presidents. I wasn't supposed to tell anyone that, but I guess it doesn't matter, now." Indeed—Mike had never told me that he'd even *met* a President of the United States. "But you were the one he always cared about the most. I guess maybe because

he never got married."

"Mrs. Williamson, how much do you know about what Mike actually did in his work? He dropped hints to me here and there, let out a fact or two, but I never got to know the full picture. I didn't even know he was with AFOSI."

"I don't really know either, Wes. It was all 'hush-hush,' all 'if I tell you I'll have to kill you,' sort of stuff. He learned lots of things about science that he said would curl a college professor's hair if he were allowed to talk about it. One thing I do know—he wanted you to join him in his work. Every time he came home he'd look over at your house and say how he wished he could get you away from your safe job. But he understood how with Eve and the girls you needed to be home nights."

My conversation with Clara was pleasant as we shared memories of Mike. But I didn't find out anything else I didn't already know until just before I left. I was at the door when Clara said, "Wait a minute. I can't believe I forgot. I have something for you from Mike. Follow me."

We went into Mike's old bedroom. I'd always envied him his wallpaper—it was of spaceships copied from Chesley Bonestell paintings from *Collier's* back in the 1950s. "Here it is," Clara said, handing me a plain 6 x 9 manila envelope. My name was written on it. It was sealed. "This was in his safe deposit box at the bank."

I shrugged and opened the envelope. There was a single black-and-white photograph inside. It showed Mike smiling, looking like Charlton Heston in his *Planet of the Apes* prime, with his arm around someone I didn't know on his right, and the second President Bush on his left. In the background was a triangular-shaped aircraft, though it looked more like a spaceship, that I couldn't identify.

I flipped the photograph over. On the back Mike had printed: "Me, the President, and the pilot of the *Fieldmouse*—*Fieldmouse*-style spaceships are the 'UFOs' most often debunked as being Venus."

Like I said, for years Mike had been telling me that textbook physics, as he called it, was a mess. Though I'd listened, I'd never really believed him. I used textbook physics to design my motors; they worked like they were supposed to. He could never show me adequate proof of his assertion. He'd just say, "Your motors work because they don't go looking for trouble."

Again sitting in my shop after my visit with Clara, I still didn't believe him. But only a few days ago I had been doing the sackcloth-and-ashes thing, wondering why Mike had died, wondering if there was any meaning to it. So just this once I was determined to give him the benefit of the doubt. I had to know.

I stayed up into the wee hours determining that I could, indeed, actually build Mike's motor as he'd drawn it. Hell, since it would be the size of a fist instead of a freckle, it shouldn't even be a challenge.

Assembling Mike's motor would be one thing—obtaining the materials and components, now that was something else. The design called for neodymium, or NIB, permanent magnets, what everyone calls "supermagnets" because of their exceptional strength. These are easy enough to come by, but the ones I needed would have to be machined to the proper specs, and the nickel-iron-boron matrix of which supermagnets are made is tough stuff.

At work the next day, after dropping my briefcase in my office, I set off for the machine shop. I wanted to see one of the machinists down there. I stepped through the door of the shop and didn't even need to search for him; he'd seen me first.

"Hello, Mr. Carl. Nice to see you again." He was young, tall, athletic-looking in a "beach volleyball" sort of way.

"Hi, Doug," I said. "You're just the man I'm looking for. By the way, Jana says hello." This last was an exaggeration, but the work I needed done would require a tech

willing to shoehorn it into his regular duties. The summer before I had set Doug up on a blind date with my Jana. He'd come away smitten; she'd put him in her "maybe" folder. Since then Doug had been more than willing to bend over backwards to stay on my good side. Not that he had to; he was a decent kid. Still, I needed his help, and now I shamelessly intended to take advantage of his unrequited love for my daughter.

I made my pitch. "I've had this idea for a new kind of motor I'd like to build. It's pretty radical. I want to make a working model of it that's human-scale before I try to design a meso version. I'm not confident that I can model it right on the computer. I can't bring the idea to the Big Boss until I'm sure it will work, so I need to build it on my own time. But I can't do all the work myself." Fortunately, our company had very liberal ideas about letting its creative staff use the lab and shop facilities after hours.

"Say no more, Mr. Carl. I'd be glad to help you. Just tell me what you need."

The shafts would have to be custom-made, but I could do that myself in my own shop. The stator rings were to be made of both copper and something else (which I, knowing what I know now, deem it prudent not to reveal), and I needed Doug's expertise to make those in addition to having him mill the magnets to spec.

I left the shop quite pleased with myself. If Mike's motor failed to work, it wouldn't be because it hadn't been properly made. As I walked back to my office, I tried to shift my thinking to my mundane work for the day, but I could feel my brain "working in the background" on the electrical aspects of the motor. The electronics needed to generate the drive waveform were straightforward to breadboard, but designing them as a unit that would fit on the motor was going to be tricky. But this was the kind of challenge I liked.

Unfortunately, I returned to my office to find two reports I needed to read, and

three phone calls I needed to make. I looked at the ceiling, sighed, and reached for the phone.

It took two months of hard work every night to finish the motor. Hard work, but far from onerous. I'd become obsessed with the motor. I built testable mock-ups of her various parts. My bench top became a jungle of rings and springs and photodiodes. Wires and optical fibers spaghettied in the corners with electrolytic capacitor meatballs. I'd suspend little supermagnets from the ceiling with fishline, dangle them inside precisely-kinked, hand-wound coils, power up the coils and watch how the magnets would move. My experiments were quick and dirty, cobbled together from crap at hand—the engineer's version of a back-of-the-envelope calculation.

But I could sense understanding coalescing. The more time I spent with it, the more the mysteries unraveled. Once-bizarre notions began to seem like obvious truths.

But even when the motor was nearly complete, I still hadn't convinced myself that it would actually work—I had an ironclad faith in Newton's Third Law. Mike's letter had said my faith was misplaced. That's why I knew the motor couldn't work.

Still, I was driven to complete it—it would be my tribute to Mike.

Apart from working on the motor, my life went along much as it always had. Except that I couldn't help looking over my shoulder. I'd notice strangers and wonder if they were watching me. Every black sedan that came down our street would raise my pulse rate. Though I had heard nothing from the AFOSI agents since that day the letter arrived, I still suspected that they, or someone like them, might be watching. Eve noticed that I wasn't myself lately, confronted me, and finally got out of me that the motor had something to do with Mike. But she knew I was no stranger to "top secret" work—not with my job—and she didn't press me for dan-

gerous details.

Jana came home a few weeks before the motor was finished. Doug began stopping by in the evenings to give me motor parts, rather than simply handing them to me at work the next day. Good for him! I didn't mind. And lucky for Doug, Jana didn't seem to mind, either.

"Is Doug coming over tonight, Dad?" Jana asked, standing beside me as I stared out the window.

"Yes—he's bringing me one more part for the motor. Actually, a replacement part. The other one broke—had a flaw in the material." Most of that sentence I said to myself—Jana had smiled and tuned me out after the "yes."

Last night had been the height of frustration. After all the time I'd put into the motor, the day had finally arrived when I'd be finished with it; when the last screw would be tightened, the switch finally thrown. I had cleared the night of any other work, put the coffee on, even pre-prepared sandwiches to eat if the night got late. Then, as I was sliding the last specially milled magnet into place, the bitchy little thing busted right in my fingers, probably due to an existing flaw in its crystal structure. Of course, now being two supermagnets instead of one, they instantaneously reoriented themselves to stick together, pinching my finger in the process. One bandage later I called Doug and asked him to make a replacement.

Problem was, tonight I did not have my time freed up. I'd noticed the lawn when I got home—it was days past needing to be cut, and in my neighborhood, proper lawn maintenance is not optional. I had a report to finish. I had to prepare for a teleconference tomorrow. In other words, life was happening.

I paced in the living room, looking outside every half minute or so. Finally Doug's red SUV turned onto the street and I headed out the door, beating Jana by three steps as she came barreling down the stairs, her long black hair

streaming behind. "It doesn't pay to look that anxious, honey," I called behind me.

"He can't see me yet," Jana replied, but she slowed from a sprint to a leisurely, carefree stroll in the space of half a step as she emerged onto the porch.

Doug was already holding up a small envelope with the magnet in it as he got out of his car. "Right here, Mr. Carl. Got here as fast as I could."

"Thank you, Doug," I said, taking the envelop. "I was all geared up to do this last night, and now—well, time is short. So forgive me for not being much of a host."

"I'll take care of him, Father," Jana said, gliding up, being more mature than me.

They were mindful of each other and not me, so I don't think they noticed when I looked up and down the street before going inside. I saw nothing unusual; no strange cars parked on the street, no unfamiliar faces out walking unfamiliar dogs.

I wanted no disturbances. I locked the office door before I assembled the last of the pieces, carefully tightening the screws, gently snapping the electronics package into place, and finally attaching the 9-volt battery and slipping it into its recess. It was all exactly as Mike had drawn it, with one modification. I had made remote controls for the motor. I knew the drive waveform would have to be tuned for optimum performance, and I'd designed the electronics so I could do this from a hand-held transmitter.

Holding the motor in my left hand, I picked up the remote with my right and turned it on. It worked! It gently hummed, the pitch getting higher and higher as it accelerated. I turned it off. It had been weeks since I'd last doubted that the finished motor wouldn't at least spin. It was the "magic trick" Mike had described that I still couldn't accept.

Imagine yourself floating on an inner tube in the middle of a calm lake. You decide you want to spin around so you start paddling. In short, you push water one way, and you spin in the other. Without drag, you could stop pushing and spin

forever, but in the real world you have to keep pushing a little to maintain your speed. Everyone knows this. It's Newton's third law stuff. Now imagine you're floating on an inner tube in the middle of a big round tub, and the tub is floating in the middle of the lake. When you start paddling to spin, the tub will start to spin the other way. Thus, angular momentum is conserved. Of course, the tub will not rotate as *fast* as you will, sitting there on your inner tube—the moments of inertia are different and so are the drag coefficients. But its initial rotation will certainly be in the opposite *sense* from your own.

You, on the tube, in the tub, are Mike's motor. The tube is the rotor, the tub, the stator. Mike says that when you start to spin, the tub will start to spin with you in the same direction.

See? Impossible. I knew it all along.

Mike's letter had specified the definitive test.

A week before I'd attached a length of 4-lb.-test line to a swivel hook and hung it from a small eye screw in the ceiling. I put a weight on it and left it to fully stretch out. Now I hung the motor from it—I'd built a small eyelet into the top of the motor so it would dangle coaxially with the line. I gently released it; it barely bounced, then simply hung there at rest. I turned the motor on with the remote and again it began to hum with acceleration. With any other kind of motor, the housing would have started rotating in the opposite direction to the shaft—in this case, clockwise. But it didn't.

Instead, it held fairly still at first, then slowly, slowly began to accelerate in the direction of shaft rotation. The rpm display on the remote control showed that the rotor was still accelerating with respect to the stator.

Mike's magic trick was real; Newton's third law was breakable.

This was like seeing a flying saucer land in my backyard.

"I can't believe it," I murmured. "I've built motors my whole life. Everything I know tells me this can't happen." Still

holding the remote, it suddenly dawned on me that I hadn't even tried to fine-tune the drive pulses yet. I turned the knob that minutely changed the pulse shape and timing. I heard the hum from the motor change slightly in pitch. I knew there should be a "sweet spot," a very thin optimum envelope where motor performance would peak out.

I increased the frequency. I sharpened the wave peak. The hum wowed and fluttered. I found the spot. The result was dramatic.

The motor went from hum to piercing whine to banshee shriek. The whole motor surged into even higher acceleration, now rotating so fast it was a featureless blur. I turned it off. It didn't matter. I'd tickled the dragon's tail and it had turned on me.

I knew what would happen. I hit the deck, ducking under the desk, peeking out at the motor from underneath. The ordinarily negligible imbalances caused by minor deviations from spec finally showed up in a wobbly precession which in seconds grew to wildly chaotic then to...BAM!...totally catastrophic—the motor shredded itself into shrapnel, the pieces embedding themselves, sounding like a machine gun, into the walls all around the room. It chewed a thin line of holes, rents, and gouges through the wainscoting about four feet above the floor.

I was still hiding under the desk when I heard Eve screaming outside the door. "Wes! Wes! What happened? Are you all right?" The doorknob was rattling; she was desperately trying to open the locked door.

Before I could answer her I heard Jana yelling. "Mom! Where's Dad? We heard an explosion!" Then Doug hollered, "Stand back from the door!"

"No! Wait!" I yelled back, still sliding out from under the desk. "I'm okay."

But it was too late. I heard a loud THUMP against the door, followed by, "Shit! That really hurt."

"I'm okay," I repeated. "I'm coming to

ANALOG

unlock the door.”

Eve, Jana, and Doug were all standing in the hallway when I opened the door, Doug holding his right shoulder, grimacing. “It’s a reinforced door, Doug. Sorry. I keep proprietary documents in here.”

“S all right,” he said.

“As for what happened. Well, the motor I was building ran really well, but I ran it up to too many rpm. I’m afraid it tore itself to pieces.”

Eve went into the office. Jana put her arms around me. “I’m glad you’re safe, Daddy,” she said.

“Too bad about the motor, Mr. Carl,” Doug added. “Want me to get started on another?”

“Maybe sometime, Doug. But right now is very much a back-to-the-drawing-board moment.” The kids went back downstairs and I went to see Eve in the office.

“You’re lucky to be alive,” she said. She was staring right through me.

There’s no lying to Eve. She knows me too well. And I was starting to shake. She held me.

“You’re really shaken up.”

“It isn’t just the accident. It’s what the motor did. It did the impossible. Mike was always full of stories of weird things he’d seen. But I never had any reason to believe him.”

“You’re going to be even more obsessed now, aren’t you?” Eve said, finally letting go. “It’s in your eyes. You’re not going to stop until you understand this completely.”

I just nodded.

“So what are you going to do?”

“You mean, now?” Shaken up as I was, the mundane suddenly had great appeal. “I’m going to mow the lawn.”

In bed that night, I started trembling. Eve held me again. She tried to initiate lovemaking, but it soon became obvious there’d be none of that tonight. She fell asleep holding me.

About 3 A.M. she found me in the office, staring out the window. She came to

the window, fitting herself in next to me. “What are you thinking?”

“*Nova Terra*. It’s Latin. Means ‘new Earth,’ or ‘new world.’ That’s what it feels like to me, Eve. A whole, new ... frightening world. I don’t know what to do.”

“Mike would have wanted you to explore it. That’s why he showed you where to find it.” Then she hugged me. Then she kissed me. “And I want you to explore it, too.”

I had only been at work a few minutes the next day when Joyce buzzed me. “I’m sorry to bother you before your first cup of coffee, Mr. Carl, but Agent Rogers is here to see you. He insists you want to see him.”

I hadn’t heard from him or Agent Smith even once since that first encounter. But somehow, I wasn’t surprised that he’d made an appearance this morning. “At least he was polite enough to stop at your desk this time. Give him points for that. Send him in.”

Agent Rogers entered, closed the door behind him, shook my hand, and put his briefcase on my desk.

“Where’s Smith?” I asked.

“In the parking lot. He’s not cleared for this,” Rogers said, not missing a beat. He opened the briefcase, pulled out a paper and handed it to me. “See if you recognize this,” he said.

On the paper was a graph that looked something like an EKG trace of a heart-beat. I examined it closer, read the labels on the axes, thought. The first half of the trace looked periodic and steady from square to square, then suddenly went to hell in the middle, dropping to a flat line near the end. “The motor,” I said. “This is the EM signature from the motor I built.”

“That’s right,” Rogers said. “For the time being, you are not to discuss the bootstrap motor with anyone other than me.” He pointed to the wild part of the graph. “Here’s where you tuned it. Got interesting after that, didn’t it?”

“To say the least. ‘Bootstrap motor’ you called it?”

"Yup. You're lucky it tore itself to pieces," he said. "You could be dead now. Sorry we let it get that far, but no one thought your first cut at it would work so well."

"Who do you mean by 'no one'?"

He smiled. "Me. Mike." He reached into his briefcase again, and pulled out a sheaf of photos—photos of me. "The guys who obtained these pictures."

I looked through the photos. Here was one of me presenting a paper at a conference three years ago. Another had me looking over poster session displays at another conference, a secret one. Me with Mike at the beach, Eve in the background with Mike's date. The last picture was of me, in my shop, just before I started up the motor yesterday.

Obviously, they had no need for suspicious black sedans

"Mike thought very highly of you," Rogers said. "He wanted us to recruit you for our working group. We've been checking you out for quite some time."

"So why are you telling me now? Because Mike's dead? Are you fulfilling his last wish?"

"Partly that. Mike wanted us to get you years ago, but I told him no. You had a young family. Once Jana was in college, I approved our looking you over. Mike didn't write that last letter—our team did. He did sign it, though, just before his last trip."

"You took the letter back."

"But not the diagram."

"I dropped that by accident."

"So that's what happened," Rogers said. "I wondered. But we'd planned on you retaining that. When I saw it wasn't with the rest of the letter, I just played dumb. If I'd taken it with me, it still would have ended up in your hands, somehow or other."

"So now what?"

"Yesterday's demonstration showed us that you are more than worthy of being extended an invitation to join us."

"An invitation? Really. How nice." I couldn't help being sarcastic. I was being

jerked around and I didn't like it. "And if I decline?"

"I'll be disappointed. You'll have to sign a few contracts I have with me swearing that you will not disclose any information about the motor, nor that you were contacted, and all the rest. After that we will leave you alone unless you violate the terms of the agreements. Simple as that. Coercing people into working with us is its own punishment."

I hadn't quite expected that response. "Uh, okay. Not to be mercenary about it, but what's in it for me?"

"Money is good. Novelty. A chance to travel. You'll find out what happened to Mike—what he was up to. Why he was killed. And let me ask you something. The physics of the bootstrap motor—do you understand it?"

"No," I confessed. "I just followed Mike's instructions. I never thought it would work—certainly not the way it did."

Rogers reached into his briefcase a third time and withdrew a CD-ROM, handed it to me. "Lots of old journal articles on there," he said. "Believe it or not, the bootstrap motor isn't that far out. It's entirely accessible from known physics. This will get you started on sorting out the physics, but it won't take you all the way there, so to speak."

I looked at the CD, then at Rogers. He was looking in my eyes—I knew what he was seeing.

I'd thought I knew just about all there was to know about motors and how they work. But Mike's motor opened a door on a whole new world. I felt fascinated, ignorant, desperately curious, and euphoric, all at the same time. Like a ten-year-old boy, lying on a tree branch, dreaming of being an engineer some day.

"That set the hook, didn't it?" Rogers said.

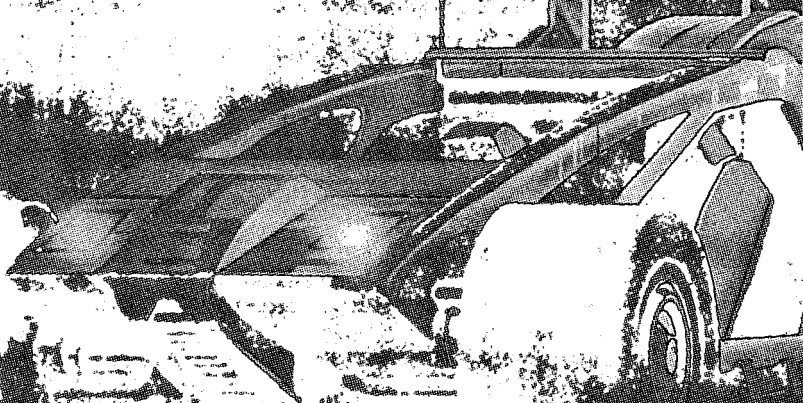
"I still have to talk it over with my wife," I said.

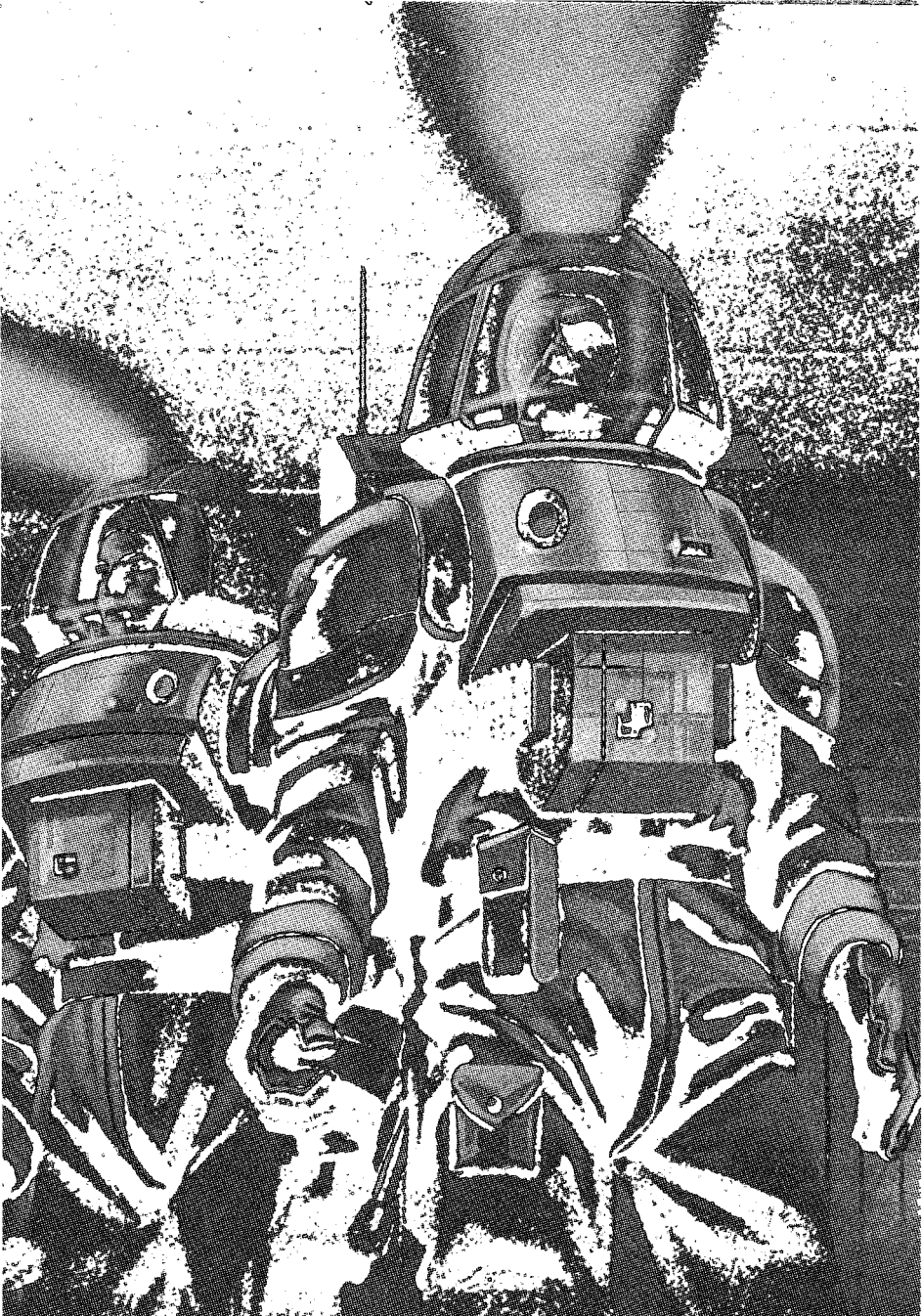
He gave me a knowing wink. "No, you don't." ■

UNCREATED NIGHT AND STRANGE SHADOWS

James Gunn

Illustration by Mark Evans





An unexpected journey leads to an unprecedented
payoff—and a new beginning.

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For who would lose,
 Though full of pain, this intellectual being,
 These thoughts that wander through eternity,
 To perish rather, swallow'd up and lost
 In the wide womb of uncreated night,
 Devoid of sense and motion?

—John Milton, *Paradise Lost*

The image in the viewscreens frightened Frances Farmstead in ways she could not identify.

The small K-type star hung against the backdrop of empty space like a lantern set out for the weary traveler. Beyond loomed the impenetrable night of the intergalactic void. Behind glowed the remote swarm of what Adrian Mast believed to be the Milky Way galaxy. In front of the spaceship from Earth loomed the goal of their long journey, this odd single planet, a bit larger than Mars but smaller than Earth, in an eccentric orbit around an old sun, here at stars' end.

The battered spaceship had been making its way toward the strange system for six months at one-gravity acceleration and six months more at one-gravity deceleration. A year of travel after their emergence from the wormhole that had spit them out on the far edge of what might be still the local galaxy. "But it could be any galaxy, couldn't it?" Frances asked. "What's distance to a wormhole? If it's like jumping across a folded sheet of paper, one place is as close as any other."

Frances stood behind Adrian and Jessica Buhler. They were seated in the control room of the ship they had decided to call *Ad Astra* but Frances insisted on referring to as *Aspera*—she had suffered with spacesickness and other problems during the trip. The control room provided evidence of long occupation: the air was thick with humidity and the odors of imperfect human bodies and not-quite-perfect machines, paint was worn down to bare metal in places, pan-

els were dented, gauges flickered or were dark. But the viewscreens were clear, and what they revealed was disturbing.

"True," Adrian said, "but it's difficult enough to keep track of intelligent life in one galaxy. Why cross intergalactic space? What could be the purpose of that?"

"What could be the purpose of sending spaceship plans across the galaxy and building a wormhole to bring us here?" Jessica asked.

That question had propelled them and their crew across measureless space and across twenty years from its obscure beginning. First had come the message in the form of energetic cosmic rays decoded by a troubled genius and smuggled out of SETI in the form of a UFO book called *Gift from the Stars*. The book had been discovered by Adrian on a remainder table in a bookstore owned by Frances, and together they had set out to find the author, only to discover him, certifiably psychotic, in a mental hospital.

But just because the author was crazy didn't mean the spaceship designs in the back of the book were not legitimate, and Adrian and Frances had forced the information on a world whose leaders were afraid of the change it would bring. The alien ship was designed to be propelled by antimatter. The plans included devices for collecting antimatter from the sun; when the machines were built and started providing clean and virtually free power to Earth, most of humanity's problems, it turned out, were caused by the competition for scarce en-

ergy. And once the problems were solved, Earth became a paradise that nobody wanted to leave. Except a few hundred malcontents like Adrian and Frances. A decade after the discovery of *Gift from the Stars*, they and Jessica, the government agent turned confederate, finally persuaded Earth's Energy Board that it was cheaper and easier to let them go than to suffer their unrest.

Five years in space turned the alien plans into a ship, and a year and a half of acceleration took them to a white hole far beyond the Oort Cloud. And a disorienting few hours—or many subjective years—in the wormhole had brought them to the place where they could see their journey's destination. But they still had no answers to the question of why the aliens had sent them the plans, what the aliens wanted from humanity—or any other creature who might receive those cosmic rays and have the scientific understanding to record them and the wit to decipher them and the technology to turn them into a vessel capable of traversing space. Did they want to help humanity, or themselves? Were they benefactors or predators, or simply disinterested observers? These were the questions that had toppled the original genius, Peter Cavendish, over the precipice edge of sanity into the chasm of madness.

And now they were close to their destination and maybe to their answers. The little world they were approaching seemed to be studded with objects like cloves in a Christmas orange. When they got near enough they realized the studs were spaceships like their own. Or maybe not quite like their own, and maybe only the starting point for new questions. Like: what were all those other strange ships doing in orbit around the little planet? It was like a Sargasso of space. They had thought the message was a summons to them, but maybe the invitation had been broadcast to the universe and they were only the last to respond....

Within a few hundred kilometers from the world—if that was what it was—Adrian and his fellow travelers could make out finer detail on the viewscreens of the control cabin. The ships were of many sizes and shapes and colors, as if the only thing they had in common was that they could traverse space. Some of the colors were so strange that the viewers could scarcely perceive them—or the viewscreens could scarcely record them.

"Maybe," Adrian said, "they come from places that radiate mainly in the infrared or ultraviolet." He was seated in front of the main forward plate, at a control panel whose purpose was mostly psychological; the computers handled everything except intentions.

Some of the shapes seemed to twist into another dimension and disappear, or the human eye was not trained to follow their pathways.

When they were close enough they saw that the ships were arranged symmetrically around the world, like electrons around a nucleus. "Must be hundreds of them," Jessica said, standing behind Adrian, on her hip a three-month-old baby clad in a diaper.

"None of them human," Frances added grimly. She was standing beside Jessica as if ready to catch the baby if it fell from its perch, even though, in weightlessness, it would fall gently if at all.

"No prejudice," Adrian said. "We're aliens among aliens, and we're likely to suffer as much from discrimination as they are."

They guided the *Ad Astra* around the little world, studying the ships and looking at the world they orbited with emotions ranging from concern to dismay. The planet was not much larger than Mars. It had a surface that was rocky in most places and in others softened, perhaps, by areas of sand. There was no sign of water and no perceptible atmosphere. It was a rocky asteroid blown up to planet size.

The motley collection of ships around it offered no evidence of life, no light, no exhalations of rocket or waste exhaust. The ships orbited in silence. The *Ad Astra* found an empty place in the shell—there weren't many—and eased itself into it. And waited. And waited.

"Nobody seems in any hurry to welcome us," Jessica said. She was slender and athletic and seemed as comfortable in weightlessness as under deceleration, but Frances was swallowing and the baby seemed as happy as if it still were floating in the womb.

"What is one more guest among so many?" Adrian said.

"You think they're all in the same situation?" Frances asked. She held out her arms for the baby and Jenny surrendered him without hesitation.

"I think they all got the same message, or a similar one," Adrian said. "Some a lot sooner than us, or they were prepared to receive it sooner, or they deciphered it sooner."

Some of the ships looked far older than the *Ad Astra*, as if they had been in space—bombarded by space dust—for centuries, maybe even millennia.

"If they got the same plans," Jessica said, "why are they so different?"

"Maybe they got plans suited to their own technologies and cultures," Adrian said.

"Or maybe they got the same plans," Frances said, making faces at the baby, distracted from her zero-gravity unease, "and read them differently, like people reading the same novel or watching the same movie."

"If that's the case," Jessica said, "we may spend a long time waiting for the welcome wagon. Whoever the others are, and whoever brought us here, probably don't have the same concept of hospitality, or of courtesy." She took the baby back from Frances. "It's time for Bobby's nap," she said. The baby didn't complain, as if it were accustomed to being parented by many different adults.

"I don't know why you call him 'Bob-

by,'" Frances said.

"We have enough Adrians," Jessica said.

"Only four," Frances said.

"And at least one on the way," Jessica said. She moved out of the control room toward the ship's living quarters.

"They could have longer lives than we do," Adrian mused, "and thus time doesn't have the same urgency. Particularly if they've been in this business for thousands of years."

"What business is that?" Frances asked.

Adrian waved his hand at the display of ships on the viewscreens. "The contact business. The summons business. Bringing sentient species here. We thought it was just us, but it wasn't. The message seems to have been intended for any technological species. But if that is the case, why are they still here?"

Frances clenched her hands around the arm rests of her chair. "I didn't want to mention it in front of Jessie, but this is like a Sargasso of space. Ships are stuck, unable to move, unable to leave."

"You've been reading too much romantic fiction again," Adrian said.

"All this may be the realization of poor Peter's worst fears. The aliens' purpose in sending the plans was to collect specimens, or to restock their larder."

"That doesn't make any sense," Adrian said. "There are easier and cheaper ways to get food."

"But not specimens," Frances said. "The zoo keeper doesn't even have to send out an expedition; the specimens come to him and deliver themselves up."

"Now you're into the horror genre," Adrian said.

"Or maybe sick comedy."

"So what do you recommend?" Adrian asked. "That we turn around and go back? It's going to take a while to replenish our antimatter supply, particularly from this old sun. And even if we had the fuel, how are we going to face traveling all this way and going back without any answers?"

"Maybe we should knock on a few doors," Frances said.

"That sounds like human impatience," Adrian said. "And, as Jessie pointed out, we're not sure how the aliens welcome newcomers, if at all. Maybe we have to prove our good intentions by waiting; maybe a decent interval is an essential element in civilized relationships."

"Maybe it's hazing," Frances said.

"Let's give it a better name: an initiation ceremony. We'll wait a reasonable time, and in the meanwhile, we'll send out our antimatter collectors to replenish our fuel supply, just in case we need to leave in a hurry."

"I don't like the sound of that," Frances said. "Are there any other antimatter collectors in orbit around that weak nuclear furnace they have for a sun?"

"Not that we can detect," Adrian said. "But our instruments may not be sensitive enough, or the other collectors may not be the same design any more than the spaceships that brought them."

So they sent their antimatter collectors to orbit the K-type sun and waited. And waited.

After thirty-five days—they still counted days and weeks and even months—human impatience being what it is, they decided to do something. Frances had said a week was long enough and Jessica, a month, but Adrian wanted to give the aliens more time. Finally he decided that five weeks was sufficient delay, for the human crew if not for the aliens. "It may be unwise to investigate the other ships," Adrian said. "Even if we knew how to enter one; even if we knew they were empty. And they probably aren't. They're probably filled with aliens doing their alien things."

"You mean, it would be like us going around to the other guests at the party, asking impertinent questions, like why they got invited, what they know about the hosts," Frances said.

"That leaves the planet itself," Jessica

said.

"But what is there to look at?" Frances asked.

"There must be something there," Jessica said. "Clearly the other ships think it's the focus of something, and clearly it is what drew us—and them—here."

Adrian's fingers moved over the buttons of the control panel. "I've been using our ground-penetrating radar. There seem to be cavities." He motioned toward the screen.

"Caves?" Jessica asked.

"Or tunnels. And scattered across that landscape"—Adrian motioned once more toward a scene that now showed, close-up, the surface of the planet—"are hotspots. They look like ordinary rocks but they are hotter than their neighbors by one hundred degrees or more."

"If the aliens live inside, they would need to get rid of waste heat," Jessica said. "Particularly if they use a lot of machinery."

Frances looked back and forth between them, as if she were spectator at a tennis match.

"And they would have to use a lot of machinery to live inside," Adrian said, "and those might well be radiators. They can recycle air and water and whatever else they find essential, but they can't recycle heat."

"So," Frances said, "they live inside. With a world like that, it makes sense. But how do we get in to let them know we're here?"

"That's a good question," Jessica said. "If they have camouflaged their radiators, it may mean they don't want to be found."

"But they brought us here—all this way!" Frances said.

"Maybe," Adrian said, "they want to be found but not too easily."

They looked at each other. It was another question whose answer could only be discovered by pursuing it to the end. "We'll never know," Adrian said finally, "until we make the effort. Radar suggests several places where the tunnels—

if that is what they are—approach the surface. We can't just sit here; it's not just us—the rest of the crew is getting restless. I am, too. I suggest we go down and see."

Frances insisted on being a member of the exploration team. It would give her a chance, she said, to feel real gravity again. Jessica, however, was placed in command of the expedition to the surface because of her greater athleticism and quicker reflexes, and both Frances and Jessica insisted that Adrian was too essential to the *Ad Astra* and its crew to risk on this kind of mission. Since he was a reasonable man, he agreed, but he grumbled about not being among those who would experience the culmination of their long labors.

"If you're comparing yourself to Moses," Frances said, "remember that he died before he saw the Promised Land. At least you're still alive."

"And, unless we run into real trouble, there will be other opportunities to get our questions answered," Jessica said.

"And if we do run into real trouble," Frances added, "you'll still be here to try something else."

So, in a small craft powered by chemical rockets, they went down to the surface, Frances and Jessica, a pilot, and two sturdy engineers. They landed gently enough for a pilot who hadn't had much experience in small craft and none in landings on airless planets of this size. "We're here," she said shakily. Frances noticed that she had been holding her breath. She had been doing that a lot lately.

They were dressed for vacuum, complete with helmets, and the voices came by way of intercoms. The surface of the planet was airless, and even if they found a way inside the likelihood of the air being breathable there, or, if breathable, not poisonous to humans, was close to zero.

They stood upon this ancient world, feet planted firmly in dust and rock, and looked around at the unpromising land-

scape: rocks, rocks, and more rocks illuminated by the feeble orange rays of the sun. Frances looked up at where the *Ad Astra* had orbited and saw scattered glints of orange where sunlight touched ships, probably not the *Ad Astra*, which had moved on since they had left it.

"Well," came a voice close to her ear, "what's going on?"

Frances started. "Nothing yet," she said, and she heard Jessica giving Adrian technical information about their landing and their surroundings.

Frances looked around. The landing was intended to be close to a tunnel that approached the surface, but she couldn't see anything that looked like an entrance. But then she didn't know what an alien would build for an entrance, even if it wanted one. Of course the aliens might have no reason to come out. Without the need for an exit, the entrance might have been permanently sealed.

"Maybe," she said impulsively, "the aliens bring other beings here to act as their eyes and ears. They sealed themselves up and don't want to come out, but they're curious and they have to find out about what's going on."

"Maybe," Adrian said.

"Or maybe," Frances went on, "they're agoraphobes who *can't* go out, and they need somebody to do the exploring for them."

"Maybe," Adrian said.

"And maybe we'll find some answers if we can find a way to get this thing open," Jessica said.

She was standing in front of a larger rock that stood like a obelisk in a field of smaller stones. She pointed to places where the rock had been chipped away, and other places where the face of the rock revealed a straight-line crack. "That isn't natural," she said tinnily.

"On the other hand," Frances said, "it may not have been done by the tunnelers but by visitors like us, trying to find our hosts. Why would they enter through a pillar?"

"Over there, then," Jessica said. "There's a cliff. That would be a good place."

She bounded over to stand in front of it. Frances and the two engineers followed more sedately. It was a good place. The rock face had been smoothed in spots, although this could have been the result of fault-line splits from heating and cooling cycles. Some kinds of tools had been at work here, as well; some cutting edges, some drills, some evidences of rock melting. Someone else had been eager to enter—when the tunnels were built or after they were completed and the builders sealed inside.

Most of all, however, there were incisions of some kind that looked as if they might have meaning—like writing, if something even more cryptic than hieroglyphics could be considered writing. They fiddled around with it, the engineers muttering engineering talk to each other and Frances and Jessica taking turns informing Adrian. They took pictures. They renewed their air supplies at the landing craft, and eventually they gave up.

Frances, Jessica, and Adrian studied the alien inscriptions on the computer screen. Adrian fiddled with the keyboard, bringing the photographic images up so close that their imperfections were exaggerated like the pores of Gulliver's Brobdignagians. Here was a place that a micrometeorite might have struck, there, that a flake of rock face might have scaled away from the effects of alternating baking and freezing. On the other hand, they might have been the intention of the carvers. Clearly they had been created, and equally clearly they were indecipherable.

Hoping for a Rosetta Stone, Adrian had asked the computer for a comparison with its vast storehouse of images, including Peter Cavendish's spaceship designs and whatever else he had inserted into the data base about the aliens and never revealed, but after thirty-six hours

the computer had come up with nothing. How could human minds find a solution that this computer, with its virtually inexhaustible memory capacity and its micro-swift data processors, could not? Frances wondered.

"One advantage we have," Adrian said, as if answering Frances's unspoken question, "is imagination. This could be instructions for opening the entrance."

"Sort of an 'open sesame,'" Jessica said.

"Or it could be a threat," Frances said, "like the inscription on Shakespeare's headstone: 'Good friend, for Jesus' sake forbear/ To dig the dust enclosed here./ Blest be the man that spares these stones,/ And curst be he that moves my bones.'"

"You think they might be dead?" Jessica asked. Her eyes widened at the thought that they might have come all this long way at the invitation of creatures long deceased.

"Maybe it's something as simple as the inscription on a cornerstone: on this date, this entrance was sealed," Adrian said.

"Or: no tradesmen; deliveries in the rear," Jessica added, getting into the spirit of the discussion. "Or: emergency exit only—warning will sound."

"That's an idea," Adrian said. "It doesn't make any sense to provide instructions that nobody is going to be able to read. So, maybe it tells aliens who come outside, for whatever reason, where to find the right entrance."

"We're assuming that the inscription was made by the aliens who carved out a habitat for themselves inside this world when their air failed," Frances said. "But maybe it's just graffiti, like the names and initials carved into famous places all over Earth. This world has had all kinds of alien visitors; maybe the inscriptions are the alien equivalent of 'Kilroy was here.'"

Adrian put his hands together and pressed his lips with the triangle formed by his index fingers. "One sample isn't enough," he said finally. "We can't expect

to come upon the proper spot in our first attempt. Let's try some other likely locations."

"Because in stories explorers always find alien artifacts or aliens themselves on their first attempt," Frances said, "is a good reason not to expect it to happen in real life. It's just a convention—a way to get on with the action."

"Not much action around here," Jessica said.

"Action is usually a sign that people have made bad decisions," Adrian said. "Frances is right: it's a convention, like the assumption that alien worlds have a single topography and climate."

"Unless," Jessica said, "like the moon and this world, they have no atmosphere to create climate and no water to change the topography."

So Frances and Jessica, the two engineers, and the pilot went down again to another site and another and another. . . . Some places they found deserts of sand instead of jagged rocky terrain; some places, deep ravines and canyons cut by ancient waterways; some places, the woody remains of what once might have been what passed on this alien world for forests, some places, dead sea bottoms full of sediment and what might once have been bones that might have told them paleontological marvels had they the time and the paleontologists to spare. On the edges of ancient canyons they came upon what might have been the ruins of buildings, but none were substantial enough to tell them anything about what kind of creatures might have constructed them or lived in them; and beside the dead sea bottoms they found piles of rubble that once might have been alien cities. Like the bones, they might have had xenological stories to tell and mysteries to solve, but all Frances and Jessica had time to do was to take pictures and move on. This was a world with all of the history of Earth—maybe more, since it seemed far older—but they had their own history that impelled them forward. They

weren't explorers; they had been sent for, and they didn't know why.

Once they were caught too far from the landing craft when the sun set. The change between day and night was sudden, and they were wrapped in darkness. The planet was on the far side of its sun, and the sky, once the sunlight had stopped glinting from spaceships above, was totally dark. In the blackness of normal space, even interstellar space, stars shone; if they were cold and remote, at least there was light and the promise somewhere of warmth and life. Frances remembered the night sky on Earth and its seductive promise of other suns, other worlds, and the challenge of getting there. Here there was nothing but empty nothing, Milton's "uncreated night," Frances thought, and shivered. The darkness was like a premonition, a reminder of onrushing death, which even rejuvenation could not permanently disable; telomeres could be repaired but not restored. She looked down quickly and clicked on her helmet lights.

In the midst of the jumbled variety of this alien world that they had decided to call "Enigma," where underground cavities approached the surface, they came upon sealed entrances—or what might have been entrances. Near a few of them they found inscriptions; some of them looked like the first inscriptions they had seen, others, totally different, which seemed to support the theory, Frances said, that they had been made by other aliens summoned like them and expressing their frustration at a lack of welcome or not finding anybody home. But they took pictures of everything and brought them back to the *Ad Astra*.

"The Enigma remains an enigma," Frances said. Weeks since they had arrived had stretched into months, and they were no closer to the basic answers they had sought. Each answer only seemed to precipitate a new cascade of questions.

"We're bombarding the place with every frequency we have," Adrian said,

"and we'd do it with Peter's energetic cosmic rays if we knew how to create and manipulate them. And we're listening to every frequency we can think of."

"Nothing?" Jessica said.

"Too much," Adrian said. "There are enough radio waves out there to fry a bird, if there was anything like that around. But we can't decipher any of it. The computer is chugging away like mad, but nothing happens."

"We could try to force our way in," Frances said. "With lasers or thermite wands or high explosives."

"Others seemed to have tried that and failed," Jessica said.

"And it doesn't seem like a rewarding strategy," Adrian said. "Even if our summoners aren't being good hosts and welcoming us to the party, breaking in isn't likely to win us any friends. And this far from home, everybody needs friends."

"Like Blanche Dubois," Frances said, "we must depend upon the kindness of strangers."

"I think we're finished," Jessica said. "We're faced with puzzles we aren't smart enough to solve. I think we should start back home."

"That's the mother talking," Frances said.

"I'm going down there myself," Adrian said. "I've let you two talk me into protecting myself and the ship, but I'm going to see that place with my own eyes."

Jessica protested and so did Frances, but not as vehemently when Adrian announced that Jessica would remain on the ship, in charge, while he and Frances descended toward the site of their first exploration.

When they arrived, the entrance was open.

Where a solid rock face had displayed only a few hairline cracks and the inscrutable incisions, a black hole had appeared, and Frances could see that the slab of rock that had blocked the entrance had slipped into a slender pit at the bottom. She laughed shakily. The

sound reverberated inside her helmet. "Apparently you're Aladdin," she said to Adrian. "It was waiting for you."

"Unlikely," Adrian said. "It makes more sense that it was waiting for the team to return."

"Don't go in!" Jessica said over the static on their receivers. "It's too dangerous!"

Frances shrugged and then, realizing that Adrian couldn't see the gesture, said, "Are we going to enter?"

"I don't know about you," Adrian said, "but I didn't come all this way to stand in the doorway first on one foot and then the other. Jessica, I know Frances and I are risking our lives and everything else in what may be folly, but that's what this whole enterprise has been—risk and maybe folly, so one more foolish risk won't make any difference this close to finding out what it's all about. If we're not back in three hours, don't try to break in. This is not the time or the place for melodrama. And if we don't get back, you're in charge. If contact doesn't occur in another month or so—you'll have to be the judge of the proper time to wait and what constitutes contact—refuel and return with what we have." And he turned toward the opening in the cliff before Jessica could reply.

Frances shrugged again. "Come into my parlor," said the spider to the fly," she muttered and followed Adrian through the black doorway into what seemed, in the illumination from the lights built into their helmets, like a space carved out of rock and then faced with a dark metal or plastic.

Behind them the door rose silently and terminally. "Maybe Peter's worst fears are going to be realized," Frances said. "No wonder he stayed home."

"Peter's fears never did make sense," Adrian said. But he didn't sound convinced. "Let's look around. With vacuum outside and an atmosphere inside, we presume, this must be an airlock."

The walls were smooth without protuberances and the corners were round-

ed, like a culvert. The far wall was flat, but no amount of feeling around for knobs or switches or levers by awkward gloved hands produced any reaction. "Maybe," Frances said, "the opening of the outer door was an accident, and the inner door failed a long time ago. There's nothing to say that the creatures who did all this are still alive. It all could be an automated process that is breaking down, bit by bit. That would explain a great deal. We don't know how long those other spaceships have been in orbit. ..." She realized she was babbling and stopped abruptly. Too abruptly, she thought.

Adrian turned his helmet toward hers, and she realized that the same thoughts had been running through his head. "About this time," she went on, "the explorers would lift their helmets and sniff the air and say, 'It's breathable.'"

Adrian laughed. It echoed tinnily in Frances's helmet. "That never made any sense either. I'm afraid we'll have to leave our helmets on until we're back aboard ship, and hope our oxygen supply holds out."

Light spilling over them told Frances that the inner door had opened. Behind it was a long, featureless tunnel, apparently burned out of the rock so that it fused into a smooth, shiny gray surface as it cooled, and perhaps with some luminescent material added so that it glowed. Frances felt as if she were in an artery of some gigantic beast.

"Apparently," Adrian said, "it took some time for the atmospheric pressure to equalize." He stepped forward into the tunnel, Frances close behind. Adrian knelt to get a better view of the floor. "No grooves, no apparent wear. But whoever built this must have moved a hell of a lot of people—well, creatures—and equipment this way."

Frances looked as far as she could down the featureless tunnel. It seemed to curve gently downward until, in the distance, the top seemed to meet the floor. "We've got—what?—a bit less than

four hours' air supply? We can explore for a little less than two hours and then get back with a small margin of safety, and hope that the doors operate in the other direction."

Adrian looked at the doorway through which they had entered. It, too, had no apparent controls. "It would seem to register motion or maybe heat."

"If that's the case," Frances said, "it should be opening now."

"Good engineering would require some built-in delays to prevent cycling," Adrian said absently. "But the others know we're here. We should allow an hour and a half for exploration in case we have any delays getting back."

He started off down the unrevealing tunnel and Frances trudged after him. It looked as if it would be another long day. "Shouldn't we leave a trail, or unwind a ball of twine or something," she asked, "in case this corridor branches?"

"We have something even better," Adrian said, "a built-in mapper."

"Gee," Frances said, "the Cretans should have had one of those."

They walked through the gray luminescent tunnel, steadily trending downward, with occasional branches right and left. They stayed with the main tunnel.

"Nothing," Frances muttered. "Nothing."

"Were you expecting something?" Adrian responded, but he, too, sounded disappointed.

"Did I ever tell you that in addition to space sickness," Frances said, "I have a touch of claustrophobia?"

"Now is hardly the time," Adrian said, but he stopped. "We're getting nowhere. We need a vehicle of some kind and a longer air supply and maybe a bigger exploring party. I think we've done everything we can."

And he turned around and led the way back through the enigmatic tunnel to the entrance that now, Frances hoped, had become an exit. Miraculously, it seemed, the wall slid down in front

of them and up in back of them when they entered, and, after a suitable pause, the other doorway opened and they walked, free and unenlightened, back onto the planet's surface.

Four days later, the engineers had put together a small vehicle like a golf cart with a battery drive, a seat for two, and a space behind the seat for two canisters of oxygen. The outer entrance now was oddly responsive, admitting anyone who moved in front of it, including the cart when it was occupied but not when it was empty.

"Clever," Adrian said. "It can discriminate between living creatures and objects that merely move. That avoids random openings and closings—for falling rocks, say."

"Or it knows who we are," Frances said. "That would explain why it didn't open the first time Jessie and I were here. It took time to identify us."

"I prefer a simpler explanation," Adrian said, but refused to offer one.

The two of them explored the tunnels as far as the cart would carry them, sometimes exploring side tunnels. In the side tunnels, which were slightly smaller than the main one, something like doorways opened into something like rooms carved out of the rock by a process similar to that which had formed the tunnels. Sometimes the rooms were interconnected like apartments or sets of offices. But all were empty and unmarked even by dust or litter or scratches.

"They've got a great cleaning service," Frances said.

"I think they did it in stages," Adrian said. "When the climate began to change, through a change in orbit or a decline in solar output, and the air began to thin, they moved inside, first into the outer layers, then gradually deeper and deeper, abandoning the first habitations as they went."

"Or maybe," Frances said, "these were living quarters for the workers."

"Or as the central fires cooled, they moved closer to what was left."

"Or they're dying off slowly and clustering together in the depths for comfort and companionship."

Adrian kept up his hope of finding something meaningful even as each journey turned up nothing. Adrian and Frances took the first few trips, and then, when it seemed safe enough, Adrian and Jessica, and then Frances and Jessica once more. Once Frances thought she saw movement at the end of a long side tunnel, but when the cart got there she and Jessica found no sign of an alien or any evidence that anything had been there.

"What did it look like?" Jessica asked.

"Like something misshapen," Frances said. "Maybe with tentacles. Or viscous, like protoplasm."

"Have you been reading those speculative books again?" Jessica asked.

"I've learned a lot from books," Frances said. "Things I never would have learned if I had to experience it all myself."

"You also learned a lot that isn't so," Jessica said. "Me, too. People who read have active imaginations, and sometimes reading overstimulates them."

"Too bad we don't have one of those Star Trek gadgets that detect life signs," Frances said. "And individual signatures."

"And transporters and magic wands," Jessica said.

"A truly advanced technology is indistinguishable from magic," Frances quoted.

"So are wishes, and wishful thinking," Jessica said.

Eventually the explorations slowed down and then ceased altogether, not so much from decision as from lack of incentive. They had another meeting in the control room of the *Ad Astra*.

"We could go through this exploration business for a lifetime and never get anywhere," Jessica said. "Explorers on Earth fanned out across the world and still left depths untouched, and that took

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thousands of years."

"That's true," Frances said. "And there's only a couple of us who can go on any expedition, and an entire planet to search. If they don't want to be found, we aren't going to find them."

"Maybe it's a test," Adrian said. He was seated in front of the control panel, as he had been so many times before, but turned to face them.

"What kind of test?" Jessica asked.

"To see if we have the determination to persist in the face of discouragement."

"If that's the test," Frances said, "I think we've failed, and we might as well pack up and go home."

"That doesn't make sense," Jessica said, putting her hand on Frances's shoulder in a gesture of support. "We've made it out this far after years of effort that for you two began almost twenty years ago, and through uncounted parsecs. What purpose would one more test serve?"

"That's true," Adrian mused. "On the other hand, we may be trying to judge alien motivations by human standards, and the fundamental nature of the alien is that it isn't human."

"But that's all we have," Jessica said.

"Anyway," Frances said, "there has to be a common denominator, a basic level of rational discourse, or all these other alien ships wouldn't be here, too."

"Yes," Jessica said. "There is a basic message, isn't there, in sending plans from afar to people who have the capability of understanding them? And of building the ship? There can't be an alien interpretation to that; it means: here's your invitation—come visit."

"Maybe it isn't a test," Adrian said. "Maybe it's a lesson."

"What kind of lesson?" Jessica asked.

"Well, they could have been here to greet us and tell us everything we wanted to know."

"Or," Frances said, "if they had been reading our novels or watching our TV, they would have got all mixed up with romantic entanglements, or differences

between political factions, or confusion between philosophies."

"But it's not a TV show or a novel," Adrian said, shaking his head, "and we have to believe that their not greeting us was part of the message."

"Sort of a negative message," Jessica said skeptically.

"Not necessarily," Adrian said. "Maybe not greeting us was a way of telling us that there are no answers at the end of the journey."

"And the empty tunnels," Frances said, "that life is a quest, not an arrival."

"Exactly," Adrian said.

Jessica looked back and forth between them. "I find that depressing. We didn't have to come all this way to get a homily about existence."

"Would we have believed it if we had stayed home?" Adrian said. "I mean—I agree with the lesson in principle—life is a search for answers, not a finding of them—but believing and experiencing are different states of mind."

"But it's so—so—much of a letdown," Jessica wailed.

"If it is," Adrian said somberly, "then we will have to get used to it, and if we are able, rejoice in it."

"I think we should make one final effort," Frances said.

"What kind of effort?" Jessica asked.

"Attach a wagon to the back of the cart, fill it with batteries and oxygen canisters, and head down as far as it will take us into that labyrinth below."

A day later Frances and Adrian passed through the gates of Enigma and headed into the bowels of what had once been a living world.

They moved slowly but steadily through the main tunnel leading downward, ignoring branches, descending steadily. They had supplies of oxygen, food, and power sufficient for two days' journey into the depths and two days' getting back, unless something broke down. Of course eating and sleeping would be a problem, but they could sur-

vive, Frances knew, on brackish water regenerated within their suits, and occasional snacks of food paste from a helmet dispenser, and they could take shifts, one driving while the other napped, as best he or she could within an iron maiden.

But there was nothing to reward their venture as they drove deeper and deeper into the hollowed planet, and near the end of the first day Adrian's despair was only exceeded by hers. "There's an irony here, isn't there?" Frances said.

"What do you mean?"

"We launched ourselves into the infinite expanse of space, and now we're heading down into areas increasingly confined." She shuddered and hoped Adrian didn't notice.

"Maybe that's what's intended," Adrian said. "The science of our times: the galaxies and the universe on one end, subatomic particles on the other—answers to the riddle of humanity lie at either extreme, or both. I know you're uncomfortable. Maybe we should turn back."

"Never," Frances said, but she shuddered again inside her suit.

And they plunged deeper. The temperature rose as they descended, as if the fires of this ancient world had not yet been extinguished. They did not notice the change themselves, but the sensors on the cart registered the information and their suits' heat-exchangers worked a little harder.

At the end of the next half-day, the main tunnel ended in a blank wall; side tunnels extended on either side. When Adrian reported to Jessica, her reply was faint. "Your transmission is fading," she said. "It's having a hard time penetrating all those levels of rock. Call it off."

"Never," Frances said, but her voice was breathless.

"We're going right," Adrian said.

They took the right branch. After an hour and several more side tunnels to choose from, they emerged into a large room that was different from anything else they had seen. Something like dark

windows broke the monotony of the luminescent walls.

"This is more like it," Frances said, but she knew it sounded as if she were not prepared for revelation.

"If it still works," Adrian said, and as he spoke the windows became illuminated. Scenes of a green world appeared behind the windows, slowly at first and then changing more rapidly as the world itself evolved through what appeared to be millennial transformations, flickering from window to window, with increasing speed until they whirled around Adrian and Frances like a fantastic kaleidoscope. The movement was too swift to detect individual creatures, only the vast movements of geologic—or xenologic—time. Gradually the procession of images slowed and the light faded from white to yellow to orange, and the landscape that had been green changed to lifeless gray.

"At last," Frances said. "They're communicating."

"Maybe not," Adrian said. "I think we've stumbled into a classroom. Alien youngsters probably could slow this thing down, inspect individual eras, find out what drove them underground."

"Then we still haven't contacted the aliens—or been contacted by them."

"This may be as close as we get."

Then the windows faded into darkness again.

"Jessica," Adrian said. "Can you hear us?"

No answer came to their receivers. Frances felt a shiver of alarm.

The windows lighted up once more, one at a time. Behind each one was a creature out of Frances's worst nightmare. Some were spidery with long legs; some, winged with segmented eyes like flies; some with great mouths like sharks seemed to be swimming in water; some had many arms like octopi; some looked like ravening animals with four legs and big teeth; some looked relatively herbivorean, almost sheeplike; but most had no earthly counterparts at all, and the mind rebelled at trying to classify them

according to human experience.

"I wonder which one is the Minotaur," Frances said, hoping that Adrian didn't notice that her voice was shaking.

"Perhaps more important," Adrian replied, "where's Daedalus?"

"Or Theseus. Unless that's you—Aladdin and Theseus. At least," Frances said shakily, "the aliens are showing us something relevant."

"This may be part of the schooling process, too," Adrian said. "Getting the alien youngsters accustomed to the idea that life comes in many forms, teaching them not to be repelled by appearance; or simply a catalog of creatures. No doubt there are ways to stop this display, and to explore the backgrounds and taxonomies of each of these creatures in as much depth as the individual student desires."

"Then they're still not talking to us," Frances wailed, not sure she could endure much more of this claustrophobic environment.

"No," Adrian said, "and I think we need to think about getting back. We've nearly reached our limit. We may never get any direct communication."

The final window, however, revealed a familiar face: it was a human face. It was Adrian himself.

"At last!" Frances breathed.

"Now I understand," Adrian said. "It's not a catalog of all the creatures who lived, or once lived, on this world. It's a catalog of visitors—"

"Maybe that's why they never revealed themselves to us," Frances said. "They knew if we saw what they looked like we'd never listen to what they had to say."

"We're still primitive creatures," Adrian said. "We still judge a book by its cover."

"That reminds me," Frances said, "ever since we saw the alien ships orbiting this hunk of rock I've been trying to think what it reminded me of: a school of predatory fish around a victim, vultures around a carcass, pigs at a trough. But I've finally come up with something

more appropriate: those ships are like patrons of a library, and they're all gathered around the information desk."

"Then why are we the only ones not getting any information?" Adrian asked.

"That isn't quite true," said a voice they hadn't heard for two years.

They looked at the final screen. The image of Adrian had been replaced by another. Looking back at them was Peter Cavendish.

Frances was the first to speak. "Peter, what are you doing here?" She started breathing again, and hoped Adrian hadn't noticed the break in the pattern of sounds reaching his intercom.

"Strictly speaking," Adrian said, "he isn't here. Right, Peter?"

Adrian didn't seem surprised.

"Adrian is correct," the image said.

"You're what?" Adrian asked. "A computer program?"

"A bit more than that," the image said.

"A person?" Frances said.

"A bit less than that."

Frances fidgeted inside her suit, wishing Jessica were here, wishing she were not, aware of Adrian beside her, conscious of the impossible image in front of them. The image in the window looked at them with a calm that was uncharacteristic of the Peter Cavendish she knew. He was the man who had deciphered the first messages from space and published them as diagrams for the construction of a space ship. He also was the man whose paranoia about the message had driven him over the edge of sanity, who had regained enough self-control to build a secret association of space enthusiasts, who had helped construct the spaceship and programmed its computer, possibly in response to alien instructions he had never revealed, to take the ship to the white hole that had led them—here. He also was the Peter Cavendish who had stayed behind when the ship left.

"Less than a person but more than a program," Adrian said calmly. "Whatever

you are, it's good to see you again. We need some help."

"As for what I am," the image said, "I am a heuristic program modeled after your colleague Peter Cavendish, capable of learning, responding, and a limited amount of independent decision-making."

"Limited in what way?" Frances asked.

"Limited to fulfilling the objectives of this mission," the image said.

"Defined by whom?" Adrian asked.

"By Peter originally," the image said, "but modified by the inputs from each of you during the past two years, with a slight preference for those from Adrian, as the chosen captain."

"So we're really talking to the computer," Frances said.

"If you prefer," the image said.

"I'd rather talk to Peter," Adrian said.

"If you prefer," the image said.

"Maybe you can answer some questions first."

"Anything you wish."

"Like the genie from the bottle," Frances said.

"Why did you keep from us the instructions you programmed into the computer that brought us here?"

"I have an answer," the image said, smiling as Peter seldom had, "but you have to understand that answers about motivation always are conditional."

"The best you can do," Adrian said.

"It was my—or my programmer's—belief that the information that the aliens had sent instructions for reaching them would delay the construction of the ship, and after the ship was completed, you—or more accurately, the crew—would be unlikely to start the engines if you knew that the computer was programmed to assume control of the ship and take you to the white hole."

"You never understood normal people," Frances said.

"That was one of my failings," the image said.

"We would have gone no matter what," Adrian said.

"I see that now. I am capable of learning, as I said."

"We could have worked to over-ride the computer," Adrian said.

"But you did not. Clearly I misread the situation, but then I was a paranoid schizophrenic, and I saw the world through glasses distorted by fear."

"But you aren't now," Frances said.

"A paranoid schizophrenic?" the image said. "No. Peter programmed me to be the person he never was—as intelligent as he but with a mind unfettered by apprehensions."

"Maybe you can tell me," Frances said, "why he stayed behind. He was the most driven of us all."

"Driven, yes," the image said. "But by fear of everything—of not finding what the aliens wanted, of finding what they wanted, of never being able to find a resting place between the two extremes. I was the perfect solution."

"I can see that," Adrian said.

"I don't see it," Frances said.

"He can stay at home, where he feels safe, and yet send out his alter-ego to discover the answers to his questions," Adrian said.

"But he'll never know!" Frances protested.

"Always the literal mind," Peter said.

"Unless we return," Adrian said. "But, of course, he's just doing what humans do: we have children to carry on our lives, to realize the dreams that we never manage to achieve, to answer the eternal questions of life and death and meaning."

"And the computer—Peter is Peter's child!" Frances said.

"Yes," Adrian said, "and Peter himself, in a sense—his mind sent out to explore the universe, to fulfill his destiny." He put his hand on Frances's suited arm.

"We understand all that," Adrian said, turning back to the image. "But why haven't you revealed yourself before? Why now?"

"I wasn't needed until now," the image said. "But you seem to have reached an

ANALOG

impasse. You're discouraged, your oxygen is almost used up, and your mapper isn't working."

Adrian looked down at his gauges. "He's right."

"Should we get out of here?" Frances asked. On top of her claustrophobia, the thought of being lost in this maze of tunnels was almost unbearable.

"As soon as we hear Peter out," Adrian said.

"I have communicated with the aliens," the image said calmly.

Frances put an arm around Adrian's unyielding waist, as if protecting them both against the terrors of the night.

"Why haven't they spoken before now?" Adrian asked.

"It took a while for them to learn our language."

"That's both too easy and too difficult," Adrian said.

"I don't understand that," Frances said.

"Adrian means that if they could send us messages, they should know our language," Cavendish's image said, "and if they don't, they shouldn't be able to learn it in a couple of months. But they didn't send us messages, they sent us images and mathematical formulations, which have few cultural relevancies."

"And they sent them everywhere," Adrian said.

"Everywhere there was a possibility of a technological civilization capable of receiving and understanding such a message," the image said.

"And how did they know that?" Frances asked.

"They had these listening posts, you see," Cavendish said. "All those white holes established near places likely to nourish intelligent life. And those who received the message and deciphered it and built their ships and came—each, in turn, has been exchanging information with the aliens as soon as the aliens could learn their language."

"But why are they still here?" Adrian asked.

"There is so much to tell, and to learn," Cavendish said. "All these creatures have histories and cultures and ideas and ambitions and art, you see, and all of these can be exchanged rapidly, but there is so much. So much experience. So much variety. So much art and science and philosophy. . . . The process could take several lifetimes. With newcomers always arriving, maybe forever."

"I can see that," Adrian said, "but still—"

"It's like a vast library," Frances said. "That's what I said when we first saw the place, didn't I? It's every bookworm's dream of paradise." Fear battled with expectation for possession of her face.

"Here I have to make a confession."

"Ahah!" Frances said. Throughout her experience with Cavendish, she had wavered between blind trust and utter mistrust.

"The message wasn't received in energetic cosmic rays, as I—or rather my prototype—always said," Cavendish said. "It was gravity waves."

"Why lie?" Adrian asked.

"I didn't think anyone would believe gravity waves," the image said. "And they were so new and so unreliable. I was afraid people would think I was making it up."

"They thought so anyway," Frances said.

"Not you and Adrian," Cavendish said, "and you were the ones who mattered."

"Gravity waves," Adrian repeated. "Does that have some significance?"

"It will later," Cavendish said. "But to answer the other question—about it being too difficult: the aliens are consummate linguists. They had to be, since they have had to communicate with a thousand other species, and, what's more, their evolutionary development produced a species for whom understanding others was a survival characteristic."

"I can see that," Adrian said.

"Well, I can't," Frances said. "Sure, you need to understand others, but even

more you have to understand the universe in which we live and work. Communication is okay, as far as it goes, but total communication can frustrate the need to get something done."

"These aliens don't understand that," Peter said.

"Frances means that accomplishment emerges from the frustration of incomplete communication," Adrian said. "Like art. Or science, for that matter."

"Then that's the point," Cavendish said.

"There's a point?" Frances said.

"Yes," Cavendish said. "The aliens want you to know that they are not the aliens you seek."

The image in the window flickered and disappeared, but Peter's voice in their earphones guided them back to the main tunnel and up its long incline until, at last, they emerged into the black sky and the ambiguity of uncreated night.

The spaceship orbited the airless planet in the company of hundreds of other spaceships, each alien to the others. Inside one of those ships, Jessica Buehler felt isolated while a man whose body was thousands of light years away told his audience a story that was more incredible than the spaceship's journey to this far edge of the galaxy.

"The aliens want you to know," Peter Cavendish said from the computer screen, "that they are not the aliens you seek."

The screen had been set up in the largest dormitory so that the entire crew could participate. The space was long and narrow and cluttered with bunks and hammocks on either wall, but almost two hundred people had crowded in to see the recording. Adrian Mast stood in front and to one side of the screen, his foot in a strap anchored to the floor. If it had not been for his serious demeanor, he would have looked like a side-show barker, Jessica thought.

Well, Peter was freaky enough.

She floated effortlessly on the other side of the room from Adrian, her arms folded across her chest. Frances in a chair on Adrian's side of the screen, with a seat belt offering a gesture at security.

Why was it always Frances and Adrian? Jessica thought, and chided herself for jealousy.

"How can it be Peter?" asked one of the bearded crew.

"I know, George," Adrian said. "Peter stayed behind. This is a heuristic program Peter modeled after himself, with most of his abilities and none of his hang-ups, and it has accomplished what we, with all our expeditions to the alien planet below, could not: it—or he—is in communication with the aliens."

"How do we know he is telling the truth?" Jessica said. The Peter she knew was capable of infinite deception.

"We don't," Adrian said. "But then we can't be sure about the truth of anything." "Including the testimony of our own senses," Frances Farmstead said.

"Then what can we believe?" a woman asked. Jessica recognized Janice Kenna. She was pregnant and had a baby in her arms.

"What makes sense in terms of our situation and the explanations that enable us to survive," Adrian said. "And maybe to understand and to manipulate our reality."

"But Peter could say the same thing," Janice continued stubbornly, thrusting out her baby toward Adrian as if daring him to deny its reality, "and he saw things that weren't there."

"And made other people see things, too," Jessica muttered.

"Peter's problem was his fears," Adrian said, "and they finally ate him up. Sure, he had his own reality, but we have a consensus reality—not identical for all of us but matching in enough places that we can co-exist and even, sometimes, interact."

Laughter rippled through the rest of the crew; there had been considerable

interaction in the past year, once they were free of the wormhole that had released them a year's journey from this spot. Being so far removed from home—Earth and the rest of humanity—had induced an odd urge to reproduce.

Some of the crew members were standing, anchored in place by an arm or a leg or a strap, like Adrian; others, like Jessica, were adrift in the zero gravity, wafted a little this way and that by air currents from the ducts. By now they had all grown accustomed to the sensations of zero gravity again, and the smell of each other and of the ship itself, worn by three years of constant living by several hundred men and women—and now children—thrown into close contact with one another.

"Data must be trusted until it is proven false," Adrian said.

"Or falsified," Jessica said. Her suspicions of Peter could survive almost any validation.

"Peter," Adrian continued, "or the program that calls itself 'Peter,' may be lying, although it gains nothing from lying—"

"Except an audience," Jessica said, "and maybe some recognition."

"That's true of us all," Adrian said. "But we shouldn't project our human motivations onto an electronic simulation. This is a computer program that lacks, or ought to lack, the feedback of audience or social response. Computer programs are capable of incredible feats of calculation but require precise and errorless instructions. Everything for them is on or off, true or false. But let us grant that this program may have developed the unusual ability to receive input and change it, or not receive input and say it did and invent a narrative that will satisfy the requirements of our situation; and let us grant that even if it is telling the truth the aliens it is reporting to us are lying—which may be more likely—I don't think we have any choice at this point except to listen."

"And evaluate," Frances added.

"And judge," Jessica said.

"All of those," Adrian said, "and then make up our minds what we should do with information that may be true, or provisionally true, or provisionally false, or clearly false. Because this may be what we have come so far to discover: why we have been summoned and what, if anything, we should do now."

"So," he continued, motioning toward the big screen, "Peter is with us now, as he has been with us from the beginning even though we didn't know it, a part of the programs that work for us and, although we didn't know that either, observe us. I think Peter has been observing our discussion and incorporating it into his reality. So, Peter, what have you learned from the aliens?"

A moment's delay stretched into minutes and Adrian began to shift uneasily in front of the assembled crew members.

"Maybe it wasn't Peter after all," Jessica said. "Maybe the aliens read our data bank and recreated Peter for their own purposes. Maybe he isn't in the computer—"

"That's an ingenious theory," Peter said, his familiar features flashing into existence on the giant screen. "But then you always were ingenious—and, next to me, the readiest believer in conspiracy theory, maybe because you were part of it."

Several crew members exclaimed at the apparition that they had not really accepted as reality until they saw it in real time. Even more shifted positions like Adrian.

"You all have doubts," Peter said, "and with good reason. I have doubts even in my present, paranoia-free condition. We are here in the presence of the unknown, maybe even the unknowable. I have only the communications of the aliens to depend upon, and you have only my word that I am receiving those communications and passing them on reliably."

"We've already discussed all that stuff," Frances said.

"I know you have," Peter said, "and I want you to know that I am aware of all your concerns and that I would ease them if I could, but all I can do is to tell you what I have learned."

"We're waiting," Adrian said.

"I have received and stored a great deal of information," Peter said. "It is stored in the normal fashion, catalogued according to standard procedures, and indexed with appropriate words and phrases. The information covers not only the archives of the aliens but some of the archives of all the other creatures in the ships that also have been invited here. Getting all of that information from all of the creatures and storing it properly will take time—more than the lifetime, extended though it may be, of any of you—and possibly technology that has not yet been developed, although my new substantiation has allowed me to perfect quantum procedures that may solve this problem."

"Most important, however, is that even based on the limited data that I have received, the information being accumulated is staggering, revolutionary, magnificent. It will transform human existence beyond anything ever imagined. The question that you will have to answer is whether human existence should be transformed, whether humanity can endure transformation without destroying itself."

Jessica's doubts shifted into overdrive, but Adrian anticipated her with "How do you know all that?"

"You always were quick to the heart of the matter, Adrian," Peter said. "And as usual you are right: I am generalizing from the massive quantities of information I am receiving, even as we speak, and its alien origins. It is an easy jump to the conclusion that these data will work the kinds of changes that I describe."

"But you haven't evaluated them yourself."

"Clearly not," Peter said, "and clearly I would not be a good judge of their impact on human minds and bodies, even

though I can construct hypothetical paradigms to emulate human responses. But if the information is of the same level of technological advancement as the spaceship design and the antimatter collectors—whose influence on human existence we all know—then the additional information promises to—"

"Okay, okay," Frances said. "Get on with it."

"The aliens who are communicating with me say that their planet once was part of a solar system not unlike ours, as ours has been communicated to them," Peter said. "But it was located on the other side of the galactic center from where we find it now and about as far out on a spiral arm as our system is."

"If we're going to have to go back to the beginnings of the galaxy," Jessica muttered, "we'll be here for days." "This was, to be sure, a couple of billion years ago," Peter went on, unperturbed.

"Good lord!" Frances said. Jessica thought that Frances was startled not so much by the scope of the narrative but, like Jessica, by its apparent duration.

"Then our galaxy crossed paths with another galaxy—a small one, fortunately, since one the size of the Milky Way would have caused much more, maybe fatal damage. This one created a few more supernovas and precipitated a few more black holes and disrupted a few systems but otherwise did little except to prepare this galaxy for a new surge of evolutionary development, of stars and planets and, eventually, of life itself. The aliens did not know then and do not know now whether this outcome was by design or accident, but it seemed to some of them, in their state of scientific naturalism emerging out of earlier supernatural beliefs, that some unseen hand had flung the smaller galaxy into their way across the vast emptiness of space."

Jessica saw Adrian shifting position as if he, too, were getting restless.

"But that, in itself, was not the strangest part. That unseen hand, if un-

seen hand it was, cupped itself around the aliens' solar system and propelled it toward the center of the galaxy."

"Impossible!" Adrian said.

"So they thought," Peter continued, "but the evidence, though slow in arriving over centuries and even millennia, was irrefutable. Their entire system was moving in relationship to other star systems and getting closer, bit by bit, to the galactic center. Where, of course, total destruction awaited."

"Of course," Adrian said impatiently.

"So, how did they escape?"

"It's like a cliff-hanger serial," Frances said.

"The events took many millions of years, and their many nationalities and contending factions began to come together under the pressure of their inexplicable galactic journey," Peter said. "At the beginning they were fragmented even more than we on Earth, which helps explain their skill in languages. And it was their skill in languages, as well as developments in science, that led to their staggering discovery."

"And what was that, Peter?" Adrian asked.

"They discovered the existence of a kind of matter that we cannot see or feel except as gravitational influences, a variety of dark matter. It was a large body of this sort, perhaps a part of the invading galaxy, that had captured the aliens' system and propelled it across the galaxy toward what seemed like certain doom."

"I can see," Adrian said, "that this account is going to take considerable time."

At last, Jessica thought, he was seeing what she had recognized some time before. She wished it were all over, and they could do something—anything.

"We can't keep everybody here for hours," Adrian said. "Go back to your tasks, and we'll record Peter's message for later viewing by anyone interested. Frances, Jessica, and I will remain here to interrogate Peter."

One by one the others drifted away,

some looking back with concern or disbelief or apathy toward the image of Peter Cavendish on the large screen and their three leaders in front of it.

Jessica thrust out her arms in a gesture of helplessness; the gesture spun her around until she stopped herself with a hand on the wall next to her and drifted across the space until she stopped near Frances. "What do you think? It all seems so strange and irrelevant."

"Like a creation myth," Frances said. "If Peter is to be believed, it started two billion years ago. Two billion years is a long time. We weren't even primitive slime."

"Long enough," Jessica said, "to dream up a story to explain how they find themselves on the edge of the galaxy."

"Scientists have speculated about the existence of such matter as Peter describes," Adrian said. "Shadow matter is what they call it, or, sometimes, mirror matter."

"I like 'mirror matter,'" Peter said conversationally. "Like Alice's 'looking glass.' You can't touch it or smell it or hear it—you can only see the evidence of it reflecting a world where everything works backwards."

"Only 10 to 20 percent of the matter in the universe is visible," Adrian said. "And only 3 percent is luminous."

"How did they come up with a figure like that?" Jessica asked skeptically.

"There isn't enough visible matter," Peter said, "to explain how stars move in our galaxy, the rate at which galaxies rotate, how much hot gas is found in elliptical galaxies and clusters of galaxies, the way galaxies and clusters of galaxies and the Local Supercluster move, or the formation of galaxies, clusters, superclusters, and the voids between. All those things require far more matter than we can see."

"It's all getting crazy," Frances said. "How are ordinary humans supposed to understand concepts like that?"

"If you want crazy," Peter said, "consid-

er string theory, which imagines a form of energy with a diameter smaller than a quark and a length thousands or even millions of light-years long. Our universe may be only the three-dimensional shadow of ten-dimensional realities."

"That's as far-out as the supernatural and of about as much use," Jessica said.

"Maybe we should let Peter continue," Adrian said.

"That's okay," Peter said cheerfully. "Computer software has no sense of urgency. Besides, while you three have been talking I have been recording the history and literature of another alien species."

"What we're concerned with at the moment is the life story of the aliens who summoned us," Adrian said, "and when the story left off, they were heading toward certain doom at the heart of the galaxy."

"You can imagine," Peter said, "that the unseen hand that had plucked them from their troubled but normal existence in a remote spiral arm of the galaxy focused their concerns on gravity. In their place, we would have done the same, but for us gravity was a constant that we incorporated in our sense of the world but never thought much about until Newton."

"And, of course, it wasn't until we progressed beyond recourse to the supernatural that we had any need for natural explanations," Adrian said.

"And so," Peter continued, "these aliens discovered gravity waves a couple of billion years before we did." "Gravity waves?" Jessica asked.

"The mechanism by which gravity propagates," Peter said. "Newton assumed that gravity was a property of matter that existed without needing a medium, but more recently scientists have come to believe that gravity waves actually alter the nature of space itself, though minutely, and have developed instruments for measuring them."

"These aliens developed those instruments early in their civilization, and im-

proved them until they were capable of measuring the smallest fluctuations," Peter said. "And finally they identified what they took to be signals."

"Signals?" Frances said. "You're pulling our leg. Or they're pulling yours, if you had one."

Peter's expression of earnest recounting changed to one of alert attention. "One of the other ships has begun to shift position," he said. His face disappeared and was replaced by a schematic of the alien ships orbiting Enigma and then by a view of one of the absurdly shaped ships moving against the backdrop of space, at first imperceptibly and then more swiftly.

"What's going on?" Adrian asked.

The actions clearly were not in real time. At least the early stages of the ship's movement had been recorded over some hours until movement was discernible, but then it went faster until the ship began to dwindle into the distance.

"What's happening?" Frances asked.

The screen was silent for several moments until Peter's face appeared again. "One of the alien ships decided to depart," he said.

"Is that bad?" Jessica asked. Peter had always been good at sleight of hand.

"Do they know something we don't know?" Frances said. "Is something happening, or going to happen? What if all the other ships start to leave? Should we get ready to depart?"

"Ships come, ships go," Peter said. "They have to make a decision, the aliens tell me. Whether to complete the transfer of information or to take what they have and go home. It is a decision that you will have to make as well."

"Not until we know more than we know now," Adrian said.

"And you shall," Peter said. "The aliens had reached the point where they perceived that the gravity waves were signals. Deciphering the signals took more generations than we can imagine, even with their skills in communication,

while their system was getting closer to the galactic center every passing millennium. And then one Enigma genius stumbled upon the key."

"The Peter Cavendish of his time," Jessica said. She could not stop herself from getting in a dig at Peter, even if this was an electronic simulacrum.

"Thank you," Peter said, "in spite of the sarcasm. Someone or something was trying to communicate with them. Eventually, after many more generations, translators began to decipher a message, or series of messages, and they finally understood that it was coming from that unseen hand, from the mirror matter that had entered our galaxy and had captured their world, and that the mirror-matter world consisted of a different kind of existence, created at the time of the Big Bang, and that it consisted of at least one sun and one planet and intelligent creatures."

As if in response to their unspoken incredulity, the view on the screen changed to the solar system as they had approached it—the solitary planet orbiting the small, old orange sun. But now Jessica saw beside it another world with its own sun and its own strange inhabitants, shadows who lived and thought and acted as people did though only dark silhouettes. The vision lasted only a moment before it faded and she turned on Adrian and Frances.

"Unseen hands! Invisible creatures!" she said, though she knew she was annoyed at her own susceptibility. "Why are we wasting our time on this kind of nonsense?"

"It is fantastic," Adrian said, "but much of modern cosmology presumes conditions remote from everyday reality. In time and if we had the right kind of instruments we could check the gravitational influences on this system. The mirror world may be invisible to ordinary measurements but not to its influence on orbits."

"But we don't have time or instru-

ments," Frances said.

"Observation would be enough if we had time," Adrian said.

"I have been recording such matters as a matter of routine since we came out of the wormhole," Peter said from the screen, although his face did not reappear, "and my observations are available for analysis."

"What other records do you have?" Jessica said. Everything Peter said rose in her throat like acid. Adrian was responding with his customary, infuriating equanimity, and Frances kept trying to fit Peter's narrative into one of her neat literary pigeonholes, but none of them was the right shape.

The screen filled with a field of stars. There were tens of thousands of them like fireflies on a summer night, many more than could be seen from the Enigma planet, here on the edge of the galaxy, many more even than could be seen from Earth. And there was something subtly wrong with the stars: they were bigger, brighter, bluer.

"At a point in their history, the Enigma aliens—let us call them 'Enigmatics'—began to record their experience," Peter said, "but some of the earliest records have been lost or degraded. They were slow to develop spaceflight, but eventually they produced computer-controlled spacecraft that could observe the changes that were occurring in their celestial neighborhood and these files were created. It happened about a million years after their galactic odyssey began."

"Why computer-controlled?" Adrian asked.

"They are profoundly agoraphobic," Peter said.

"Though fortunately not claustrophobic," Jessica said.

"Whether they were agoraphobic from their beginnings is uncertain," Peter said, "but the experience of being removed from their original location and hurtled toward the center of the galaxy left them clinging to the familiar."

The view changed. Now it revealed a sun that seemed about the size of Earth's but a bit brighter. Gradually, as if a camera were moving in, planets came into view, a small planet, three gas giants, and then some smaller planets. One of the smaller ones had a familiar blue color, but it had two medium-sized satellites instead of one large moon. From the planet bright flares arose. One resolved itself into a small spaceship that went into orbit around the planet. The other flares also shut off; if they were ships, as well, they too might have gone into orbit. Then the ship that was visible began to move again, although without apparent means of propulsion, picked up speed, and dwindled into nothing.

"I don't understand," Frances said. "That's not the Enigma planet."

"It's how it looked nearly two billion years ago," Peter said.

"But there are other planets and two moons," Jessica objected. "Now there is only one world and no moons."

"Sacrificed to the greater purpose."

"My god!" Adrian said.

"Adrian is beginning to understand," Peter said.

"What greater purpose?" Jessica asked. "Why are all those ships taking off? How are they propelled? Where are they going?" She felt a little nauseated, like morning sickness.

"They are going to explore other solar systems," Adrian said. "As Enigma moved through this arm of the galaxy, it was gathering information about what lay ahead in the center of the galaxy."

"That makes sense," Frances said.

"And probably information about nearby stars," Adrian said.

"Particularly those that were likely to have planets," Peter said.

"How did they know?" Jessica asked.

"They were obsessed by the stars, you understand," Peter said, "and had millions of years to try to cope with their situation. They developed orbital telescopes that provided a great deal of information, as well as these records, and then

they had the guidance of their masters in the shadow world."

"How could the shadow world creatures get information?" Jessica objected. "They didn't have any connection with our reality!"

"Except gravity," Adrian said.

"Exactly," Peter said. "Gravity was their ears and eyes and noses and fingers. They not only made themselves felt by gravity waves, they perceived things in our universe in the same way, and perhaps with greater clarity, since gravity waves are everywhere."

"I don't know the wavelength of gravity waves," Adrian said, "but surely it isn't small enough to pick up much detail."

"It may if that is your only sensory input," Peter said, "and if you set up triangulations or interference patterns. But then fine detail may not be necessary if you are dealing with matter on the planetary scale."

"What I don't understand," Jessica said, "is what was providing the propulsion for the ships that moved off the planet by what I take to be chemical rockets?"

"I'd guess it was the Shadows," Adrian said.

"So did the Enigmatics," Peter said. "Their job was to put them into orbit. They didn't know what happened to them afterwards. But they noticed that some of the distant planets they were observing seemed to undergo subtle change."

"Surely the ships they were sending couldn't alter star systems!" Frances objected.

"No," Adrian said, "but the Shadows could when they saw that changes were necessary."

"Necessary?" Jessica said. "What kind of changes?"

"To make those systems more congenial to life," Adrian said.

"Why would they want to do that?" Frances said.

"So that they would be receptive to the next wave of ships," Adrian said.

ANALOG

"And what would they carry?" Jessica asked.

"Something that would encourage the existence of living creatures," Adrian said. "Right, Peter?"

"The seeds of life," Peter said.

Suddenly the pictures on the screen assumed a different appearance to Jessica. Now they looked like spermatozoa spurting out to fertilize a sea of ova. "The seeds of life?" she said. "That is about the dumbest thing I've ever heard."

"It's pretty wild," Adrian admitted.

"And the implications are even wilder," Frances added.

"What in heaven's name are the seeds of life?" Jessica said.

"In some situations, it meant preparing planets to nurture existence," Peter said. "Altering orbits, encouraging planetary wobbles, adjusting chemistries. But where planets were ready, the ships scattered the seeds of life."

"You said it again," Jessica said.

"It isn't clear whether by 'the seeds of life' the Enigmatics mean carbon compounds, spores, or actual RNA or DNA sequences," Peter said.

"What it means," Adrian said, "is that the Enigmatics may have been responsible for life in our galaxy."

"That's a staggering thought," Frances said.

"If true," Jessica said.

"The question is," Adrian said, "how did the Enigmatics come up with the knowledge and the means to do this sort of seeding?"

"They were simply following instructions from the shadow creatures," Peter said.

"All encoded in gravity waves?" Adrian said skeptically.

"They had many thousands of years to receive those instructions and to decipher them."

"That would make the shadow creatures some kind of gods," Jessica said.

"The supernatural but with a natural explanation," Adrian said.

"That, of course, is how the Enigmatics thought of them," Peter said. "And there wasn't much difference between the commandments of the Shadows and the injunctions of our own pantheons, except that the Shadows' were more practical. The Enigmatics had proof of the power of their gods: their entire system had been yanked out of place and was being hurtled toward what looked like certain doom, even if it was a million years in the future."

"There was that," Jessica said, "if that can be believed." She wasn't believing much of it.

"The Enigmatics believed it, and that was important," Peter said. "Moreover, they believed that the shadow creatures had the power to save them, or their remote descendants, if they interpreted their messages properly and obeyed their commands. There must have been many failures before something worked. And, of course, they had proof."

"So did all the religions we know about," Frances said. "It all depends on what you consider proof."

"They could measure the effects of shadow matter on their system," Peter said, "and they could record the gravity-wave messages and when they interpreted the messages properly, the ships they built worked, and they were propelled toward their remote destinations by unseen forces."

"All of which sounds like superstition to me," Jessica said. "That's the way superstitions grow, attributing natural processes of trial and error and eventual success to proper interpretation of a divine message. Who is to say that it wouldn't have worked if scientists and engineers hadn't simply built those things on their own?"

"And who is to say," Frances added, "that the Enigmatics in charge of the translation—surely there were only a few of them, like priests or sibyls—"

"Or Cavendishes," Jessica said.

"—weren't in cahoots with scientists and engineers who wanted to get their

work funded by appealing to supernatural beliefs?"

"You're getting as paranoid as Jessica," Peter said.

"And who is to say," Adrian said, "that the original Peter Cavendish didn't create the plans for the spaceship we built and the antimatter collectors—?"

Frances shrugged. Even though she was strapped to a chair, the movement brought a look of unease to her face.

"All right," Jessica said.

"And who is to say," Adrian said, "that all of these alien ships didn't get built in the same way and find their own wormholes and end up here?"

"Okay," Jessica said. "I admit that I'm a skeptic, and I admit that there is some evidence for part of what Peter has been telling us. But I hope you also will admit that there are alternative explanations, and that nothing Peter has said in the past has been without subterfuge or double meaning."

"I'll admit all that," Peter said. "The person who programmed me was a troubled man, and I can't be sure I am free of his paranoia, but I feel and believe that I am reporting everything accurately."

"One question I've been puzzling about," Frances said, "is if the Enigmatics scattered the seeds of life across the galaxy, why did the creatures turn out so different?"

"Even if it were DNA," Peter said, "environment and chance play an inevitable part in shaping the final result."

"Chemistry, asteroids and other cosmic collisions, eruptions, climate changes, crust movements, disease—" Adrian said.

"Even the development of intelligence and its combination with aggressiveness aren't foreordained," Peter said. "There must have been many failures, many blind alleys as in the evolution of humans, and many instances in which intelligence got embodied in some other form."

"Evolution favored the primates on Earth," Adrian said. "Maybe the equivalent

of the dinosaurs or the whales or the dogs got touched by the magic wand elsewhere. Big, convoluted brains and opposable thumbs—that may be all that's necessary."

The screen changed to a blinding view of massive suns crowding the perspective. Then the glare diminished, as if a filter had been placed in front of the lens, and they could see some of the individual suns. Some were exploding, some were shrinking into nothingness, and some had their essence sucked away, in long, colorful streamers, into a halo feeding into a blackness beyond black.

It was like gazing into the mouth of hell.

Jessica stared at the images on the screen, trying to comprehend the titanic energies exploding in front of her, epic catastrophes, primal violence. Adrian's voice shook her out of her trance.

"That, then, is the center of the galaxy," he said. "One hears about it, one tries to imagine it, but the reality is beyond imagination."

"And this is what the Enigmatics saw as their fate," Peter said, "broadcast back from probes that recorded events here for some millions of years—a gigantic black hole surrounded by thousands of stars being torn apart by tidal forces and feeding their substance into the gravitational well."

"What did they do?" Frances demanded.

"Nothing," Peter said. "They could do nothing. Or almost nothing. They had used up their two satellites making spaceships for the shadows and tunneled out their own planet for metals. They retreated inside the planet and waited for the end."

"And yet they survived," Adrian said.

The view on the screen shifted to the Enigmatics' solar system in the foreground, the violence of the galactic center in the background, small but growing larger. "Their hope, their almost religious

faith, was in the shadow creatures, but as powerful as they were, the Enigmatics could not imagine how the Shadows could move an entire system. Maybe, some speculated, a single world, but what would a planet be without a sun?"

"And yet—?" Adrian prompted.

As the violence in the background increased, one of the three gas-giant planets loomed larger and then seemed to recede, first slowly, then more rapidly. The view drew back. The gas giant was moving out of orbit and hurtling away.

"The shadow creatures were trying to alter the direction the Enigma system was moving by ejecting mass," Adrian said.

As he spoke, another gas giant detached itself from orbit and was thrown aside, and then a third, and then, one by one the smaller worlds followed until only Enigma remained.

"These views must have been taken over a period of years," Adrian said.

"Actually more than a thousand years," Peter said.

The raging cataclysm in the background began to move slowly off center. "Another five thousand years passed, and the Enigmatics realized that their direction had been altered. The difference was only a fraction of a degree, but it was enough over the long millennia that yet remained to raise the hope that they would skirt the galactic center rather than plunge into the heart of it."

On the screen the central fury increased in size and frightening intensity until Enigma's sun faded by contrast. Slowly the maelstrom slid to the side. A sound like a discordant symphony emerged from the speakers and grew slowly until, when the galactic fury was at its closest, it screamed like creation itself. They had to cover their ears while they watched, on the screen, the Enigma world change appearance from blue to yellow and then to dull gray. The Enigma sun grew brighter and then slowly faded into orange, prematurely aged but not destroyed. The discordant symphony

ebbed, and the viewers could once more speak.

"What was that?" Frances gasped.

"Chaos given voice," Peter said.

"You're trying to intimidate us!" Jessica said. It was more of Peter's sleight of hand.

"What he's trying to do," Adrian said, "is to make us feel what the Enigmatics endured."

"That's right," Peter said, "although it's all there in the Enigmatic records."

"I can't believe the center of the galaxy made that kind of noise," Frances said.

"Noise, yes," Peter said. "That kind of noise? Who can say? There are no ears to hear or minds to interpret, and no medium to transmit sound. And if there had been ears to hear, they would not have lasted long enough to register any sound. But there were instruments in space and on the surface as the sleet of radiation blew away the atmosphere and not long after that the oceans and everything on the surface except rock. The noise you heard was the sound of radiation and of planetary catastrophe."

"Peter has become a poet," Jessica said.

"Epic events can bring out the poet even in a computer program," Peter said. "Compared with this, *Paradise Lost* was a family dispute."

"We didn't detect any radiation at Enigma's surface," Frances said.

"That was more than a billion years ago," Peter said. "In a billion years all but the longest-lived radioactives decay."

"And since then the Enigmatics have huddled in their tunnels?"

"And tried to survive," Peter said. "And tried to reconcile their experience with their faith in the Shadows. They had been saved, but they had also been nearly destroyed by the same hand. And they had lost almost everything. But finally they found peace in the realization that all this had been for a purpose."

"Like any other believer," Frances said.

"And what was the purpose?" Jessica

asked.

"They had to pass through the fire, so to speak, so that they could continue their mission," Peter said. "They had seeded with life one spiral arm of the galaxy, and their next task was to seed another."

Frances, who had been staring down at her hands, looked up at the screen, which now showed a view of a jet-black sky loaded with stars.

"Our solar system is in this arm, right?" Adrian said.

"That's right," Peter said. "The reason for the Enigmatics' ordeal was so that they could foster us—and some tens of thousands of other creatures on thousands of other worlds."

"I don't know how much more of this I can stand," Frances said.

"There's only a little more," Peter said.

"Only another billion years or so," Jessica said.

"It is difficult to believe that one sapient species could endure for two billion years," Peter said, "but they had the Shadows and, for the first billion years, the threat of the approaching galactic center to focus their thoughts, and then they had their manifest destiny."

"That isn't the only thing that's difficult to believe," Jessica said, but Adrian placed a hand on her arm and stilled her angry motion.

"Surely they didn't use the phrase 'manifest destiny,'" Adrian said.

"Like everything else I have told you, it is a translation, and a shaky one at that," Peter said. "John O'Sullivan used the phrase in the middle of the nineteenth century to rationalize the American expansion to settle the continent. The Enigmatics used something like it to describe their obligation to spread life through the galaxy."

The view on the screen receded to reveal a spiral galaxy, its hub burning with massed stars, its bright, spiral arms turning majestically. It could not have been the Local Galaxy, Jessica thought, but the Local Galaxy might have looked like that

if there had been a camera in some other galaxy aimed this way.

"The Shadows," Peter said, "instructed them how to create wormholes and how to harness dark energy to keep them from collapsing, so they didn't have to wait for ships to traverse the light years between the stars."

"Dark energy?" Frances said.

"Something is pushing space apart," Adrian said.

"Einstein called it 'the cosmological constant,'" Peter said. "He used it to explain a stable universe, and then abandoned it when astronomers discovered that the universe was expanding. Recent cosmologists have discovered that the rate of expansion is increasing and speculated about a 'dark energy' that makes up maybe 70 percent of the cosmos and repels matter rather than attracting it."

"Sounds like more of the supernatural," Jessica said.

"The more we learn about the universe," Adrian said, "the more supernatural it seems."

"Without dark energy the wormholes would not have lasted," Peter said. "With the wormholes, contact with almost every star capable of nurturing life became possible, and they seeded them and watched them develop, each in a different way. It was a demonstration of the power of the animate."

"As opposed to the power of the inanimate?" Frances said.

"Those are the two great powers in the universe, not the natural and the supernatural but the animate and the inanimate," Peter said. "The inanimate seems to dominate, to proceed down its inexorable, predestined path between primal birth and final extinction. The inanimate doesn't care whether stars explode and new elements are created, whether planets are formed, whether they are large or small, poisonous or nurturing. All that was laid down in the laws that prevailed when the universe was budded from the great potential for creation. But the animate has the power to intervene, to

change the essential nature of the planets and the atmospheres that surround them, even the stars themselves. Always and forever it is the struggle of the animate's will against the inertia of the inanimate."

"That's all very pretty," Frances said, "but what does it mean?"

"And why are we here?" Jessica said.

"Why are we all here?" Adrian said, sweeping his arm to indicate the other ships surrounding Enigma. "Why did the Enigmatics send spaceship plans to us, and, presumably, to all the others?"

"Indeed," Peter said. "That is the question that drove my programmer into a mental institution and kept him from seeking the answer that he needed so desperately. And the answer is simple: the Enigmatics were asked to bring us here—those of us who were sufficiently advanced to intercept and decipher the message—for one last meeting, to share the data that each has accumulated in the long struggle between animate and inanimate matter, each in its own way."

"A gigantic information booth," Frances said. "A vast encyclopedia."

"But why do you say it is the last meeting?" Adrian asked.

"The Shadows can do much," Peter said, "but they cannot alter the path this system must pursue, and it is headed out of the galaxy into the emptiness of intergalactic space. The ability of the Enigmatics to maintain the wormholes is diminishing."

The view on the screen showed a darkness unrelieved by stars.

"What does that mean?" Jessica demanded. "That we can't get back?"

"It hasn't happened yet, and it won't happen tomorrow, or maybe next year," Peter said, "but within a few years they certainly will begin to fail, and perhaps sooner."

"And that's why one of the alien ships left?" Frances said.

"And why others will leave," Peter said, "but not all."

"Why not all?" Adrian asked.

"Those who continue into intergalactic space will inherit the full encyclopedia, and maybe the relationship with the Shadows when the last Enigmatic dies," Peter said.

"And when will that be?" Jessica asked.

"Those who remain are very old," Peter said. "And they are not well. The storm of radiation from the galactic center did not leave them untouched. Their ability to reproduce suffered, and those that were born were damaged. That is one reason you never met them."

"How many?" Frances said.

"Only a handful."

"How horrible!"

"Sharing data is not enough," Adrian said. "The Encyclopedia of all knowledge in the galaxy is a noble enterprise and a powerful tool, but—"

"You are right, as usual," Peter said. "There is a Purpose: to the conflict between the animate and the inanimate has been added the struggle between intelligence and the universe. The universe began in violence when no life was possible and will end in eternal darkness when no life is possible; between these two extremes, life emerges and develops intelligence. Intelligence has the power to contemplate, to understand, to imagine, to plan, and to act, and to frustrate the inexorable processes of matter. The Shadows created us as an alternative to chaos."

Adrian was silent. Frances was silent. Jessica was silent. Even Peter was silent. The end of their long journey had arrived and the answers to their questions, and they could not look at each other.

"So," Jessica said, "we finally have answers. If they are answers." They were not answers she could appreciate.

"This is our choice, then?" Adrian said. "To stay and continue to gather information? Maybe the critical piece around which everything else pivots? Or to return home while we can, with what we have?"

"Or to continue with the Enigmatics on into the Great Dark," Frances said, "learning how to talk with the Shadows, learning their vast secrets in ways the superstitious Enigmatics could not?"

"If we can believe any of this fantastic story," Jessica said. Incredibly, the others were acting as if Peter's incredible story was true.

"It is fantastic," Frances said, "but maybe believable because it is fantastic. Could Peter have invented something like this?"

"Maybe the Enigmatics invented it," Jessica said. "Oh, it doesn't matter. There's nothing to validate any of this. It's all airy nothing."

"That's my line," Frances said. "... imagination bodies forth the forms of things unknown and gives to airy nothing a local habitation and a name."

"We do have validation: the scenes from parts of the galaxy that could only be viewed by something passing through them—" Adrian said.

"Easily faked," Jessica said. "Especially by someone as clever as Peter or the Enigmatics."

"The spaceship plans weren't faked, nor the wormhole, nor this world, nor the ruins and the caverns we explored, or the pictures we saw there," Adrian said.

"And yet there is no proof of the Shadows," Jessica said. "And no proof possible. Even if we determined the existence here of dark matter, or shadow matter, we can never prove that it harbored living creatures and that they communicated with the Enigmatics. We have to take the word of an unreliable narrator."

"Just like any kind of scientific hypothesis," Adrian said. "The explanation may be fanciful but it answers all the questions. As scientists, we place our faith in things unseen as long as they explain the data and predict the future without refutation."

"There is this great mystery," Frances mused, "and maybe we can hang around and solve it. Wouldn't that be some-

thing?"

"And maybe we hang around and spend the rest of our lives pursuing shadows," Jessica said.

"I understand that you want to go home, Jessie," Adrian said. "You have Bobby, and you and all the other mothers want a place to bring up children. That's natural, and I understand it."

"No, you don't," Jessica said. "Being a mother doesn't mean you're any less a scientist or an explorer." She was a mother, yes, and she would protect her child against any threat, and struggle to make it a home, but that didn't mean that she would reject adventure.

"Yes, it does," Frances said.

"Well, neither of you are mothers," Jessica said.

"But those feelings have to be part of our calculations," Adrian said. "You, Frances, want to solve the mystery of the Shadows—"

"No, I don't," Frances said. "I just don't want to go home. If we went home we'd have to cope with all those people who didn't want us to go in the first place, and the people who aren't going to believe what we bring to them. And the people who called me fat and ugly all my life."

"You're not fat and ugly," Jessica said, putting her arm around Frances.

"I was," Frances said, "until I acquired character. But there's a third way. We could keep exploring on our own, maybe find a habitable planet and settle down to build our own world."

"That's true," Jessica said. "Going home has all sorts of drawbacks. Do you realize what kinds of people are waiting back there? The dolts, the stick-in-the-muds, the stay-at-homes, the let's-not-change-anys, the Makepeaces."

The view on the screen changed to one of a blue planet fringed with white clouds, and nearby an oversized satellite.

"That's Earth," Frances said. "Are you trying to influence us, Peter?"

"Presenting the alternatives," Peter said.

"And what about you, Peter?" Adrian asked.

"I'm staying, of course," Peter said. "This is what I came here to find, the puzzle, the greatness. I wouldn't miss this for anything. I'm going to download myself to the memory of the Enigmatics and share in the mystery of the ages, maybe even inherit the intermediary role."

"So, whether we stay or go, we'll miss you," Adrian said.

"Not at all," Peter said. "The advantage I have over you material creatures is that I can go and remain behind. I'll leave a perfect copy of myself."

"You're right," Adrian said. "We can't both stay and go. But, Peter, it may surprise you to learn that we are glad you will be with us, wherever we are."

"If I were capable of being glad, I would be," Peter said.

"If we leave," Adrian said, "we'll never know the truth of anything we've been told."

Frances looked hopeful. Jessica felt upset and defiant.

"But if we stay, the chances are we won't know either," Adrian continued. "It is a mystery that took a billion years for the Enigmatics to accept, and even then it may have been a creation myth propagated by isolation, impending peril, and priests."

Frances looked quizzical. Jessica felt relieved.

"Our downloaded data is incomplete," Adrian continued, "but it contains marvels such as the data on the galactic center—"

"And longevity and inexhaustible power sources and insights into the condition of existence from a thousand perspectives," Peter added. "The wisdom not just of the ages but of a thousand ages."

"Do we have the right to deprive humanity of that?" Adrian asked.

"What has humanity done for us?" Frances asked.

"We are part of it," Adrian said. "And although it may be only a pretty story, the

concept of intelligence struggling against blind matter captures my imagination. We must offer humanity a chance to be part of it, to make a difference."

"It's only a story," Frances said.

"It's by stories we define ourselves," Adrian said. "Humanity is a story, science is a story, all of us are stories, and we write new ones for ourselves every day. How will this story end?"

Jessica looked from Adrian to Frances and back again. Frances, she thought, whatever she said, wanted to return, and Adrian, whatever he said, wanted to stay. She loved him, and loved Frances, too; he was capable of drifting away into silent space, pursuing his own thoughts, but they were generous thoughts, great thoughts maybe, and capable, also, of being with her more than any man she had ever known, only occasionally, but they were special occasions. "Maybe there will be celebration when we return," she said.

"And resentment and hatred and disbelief in anything we say," Frances added.

"All of that," Adrian agreed. "If we return, we will have to proceed cautiously, releasing our information slowly as humanity is capable of receiving it."

"That might take millennia," Frances said.

"If Peter is right and we can apply the Enigmatics' longevity processes to ourselves, we may have that long," Adrian said. "The struggle may be endless, true, but maybe we can prevail. Maybe intelligence can reshape the universe, can stop its long slide into oblivion. Or if not us, then maybe our descendants will succeed. Or if not our descendants, then the intelligences they might create."

"Then you are determined to return?" Frances said.

"I'm only one," Adrian said. "We will have to ask the rest of the crew."

"They're like me," Jessica said. "They'll want to return."

"And if they didn't," Frances said, "Adrian would convince them. You're a per-

suasive man, Adrian. You have persuaded me. I hate humanity, but I will learn to love it again for your sake."

So, Jessica thought, they would return with their story, a sequel to Peter's credulous account of alien contact, and the kind of story would depend upon the way they told it—a contemporary novel of existential despair, an epic that defines a people, a revelation that becomes sacred text, a fantasy that feeds ancient yearnings, an encyclopedia to implement almost every human aspiration, or a how-to volume for reshaping the universe. Or maybe all of them.

Six months later the *Ad Astra* broke

loose from orbit and headed back toward the star-strewn galaxy to begin its long journey home. ■

What is your substance,
whereof are you made,
That millions of strange shadows
on you tend?

—William Shakespeare

(EDITOR'S NOTE: Earlier stories of the *Gift From the Stars* and its consequences are "The Abyss" [July/August 2000] and "Pow'r" [January 2000].)

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A FEW GOOD MEN

Richard A. Lovett

At first glance
it looked like a familiar old story,
but it was a lot more complicated than that. . . .

Brenda Brewster gazed across the thin streamer of steam escaping the plastic lid of her coffee cup. "Have you noticed that there just don't seem to be any good guys anymore?" she asked.

Tiffany Robertson suppressed a chuckle. "Since when have you known *any* good men?" She cautiously raised her own cup and took the tiniest possible sample of the scalding liquid. "And why's this stuff always too hot until all of a sudden it's ice cold?"

"It's that miracle cardboard in the cups. It puts on this great show until all of a sudden it just gets tired and gives up. Kind of like—"

"Don't say it." Tiffany wasn't sure precisely what analogy Brenda was about to make to her latest boyfriend, the gone, but-not-gone-long-enough Brad, but whatever it was, Tiffany had heard the refrain too many times before.

Brenda's disgust with the opposite sex was legendary. Sometimes she

blamed the men, sometimes her parents for afflicting her with an impossible name. Not that there was anything wrong with "Brenda." It was that awful alliteration. When Tiffany and Brenda met, in junior high school, Brenda was going through a chubby period and the boys had called her BB behind her back (and sometimes to her face) "because she's round as one." Ha-ha. Brenda had long ago lost the weight, but she was still wearing the scars of adolescence—scars that caused her to swoon over any hunky guy who looked her way, even the ones Tiffany reflexively dodged. But if Tiffany said any of that, Brenda would tell her that when your parents bequeathed you a name like a sorority queen and the mane of golden hair to go with it, you were never going to want for men, and by luck of the draw, a few just might be marginally okay. Although, come to think of it, there hadn't been many good ones of late.

Sometimes, the best way to deal with

Brenda was to take the initiative. "What's wrong with those guys over there?"

"What, you mean the *chiropractic* students?" Brenda let the disapproval practically drip from her voice. The coffee shop wasn't far from a chiropractic college, and before and after classes, it often filled with students poring over their books. Four students at the next table were grilling each other on what sounded like anatomy. "That's the anterior cruciate ligament," one was saying. "There's also an MCL. What's the difference?"

"What's wrong with chiropractors?" Tiffany asked. The students tended to be her age—people who'd chosen to live a few years before venturing to grad school. In Tiffany's book, that was a mark of maturity.

Brenda snorted. "Can you imagine what would happen if you needed a back rub? I want a guy who'd make me feel good. Not 'Oh gee, can I adjust your vertebrae?' *Crunch, crunch*. How romantic."

Tiffany started to object, but then another snippet of conversation drifted their way from a second study group. "What's first aid for a sucking chest wound?" a woman, apparently studying for her EMT certificate, asked a quartet of males.

"A what?" one of the men responded. Most likely they were studying for their EMT certificates. Tiffany had hung out in the shop long enough to know that many of the students supplemented their credentials in this manner.

"That's the question written here," the woman said, gazing at a pamphlet. "We never used that term in class."

The man pondered a moment, then his voice brightened. "Oh," he said. "I bet it's a really nasty pneumothorax. First, you need to—"

Brenda laughed. "I rest my case," she said. "Do you *really* want to date someone who deals in sucking chest wounds, but only if you call them pneu-

mo-whatevers? And who's likely to talk about it at dinner?"

From there, the conversation shifted not only from chiropractors, but also from men. Or at least from attainable men. Brenda was updating Tiffany on the loves and losses of the Hollywood set. "So now Patrick's taken up with Julianne," she said animatedly. "How stupid can the man get? She'll dump him within a month, just like she did Brent."

Tiffany knew that Patrick was the hunk to end all hunks. But she was a bit vague on Julianne and Brent. She liked movies, but the actors' off-screen lives always left her mind in a whirl.

Her attention kept drifting back to the study groups. *There's nothing wrong with these guys*, she thought. A bit nerdish, perhaps, but what trade doesn't have its specialized terminology? Try dating a stockbroker, for heaven's sake. If you let him talk shop, he'll bury you in P/E ratios, margins, betas, and phrases like "right now, the technical doesn't look good on that one." Tiffany knew. She'd gone out with one last year and had made the mistake of asking the difference between a good and a not-so-good technical. Ten minutes later, her dinner was cold and she'd still not understood.

She surprised herself by smiling at the memory. Randall Wilkins III hadn't been half-bad until he'd stood her up on their fourth date. In fact, she'd been starting to have illusions that he might be *the* one. Then he'd failed to show up and hadn't even bothered to call with a lame excuse. Tiffany had been so furious she'd left a trail of angry phone messages all over town. But he'd never returned any of her calls.

The sound of snapping fingers pulled her back to the present. "Earth to Tiffany," Brenda said. "Are you planning to throw yourself at those guys now, or finish your coffee first?" The EMT trainees had shifted to head injuries, while the anatomy group was working

its way downward from the knee. "I bet they'd happily explain the bones of the foot to you. Maybe you could offer up your size sixes for show-and-tell, and we could find out who has a foot fetish."

"*Brenda!*" Tiffany fixed her friend with as stern a gaze as she could muster. "Sometimes you're disgusting! And keep your voice down! There really isn't anything wrong with those guys."

Brenda grinned wickedly. "So go ahead, finish your coffee and abandon me for them." She faked a teary sniff. "Or maybe you better not wait." She tilted her head toward the far side of the coffee shop. "It looks like you've got competition."

Tiffany had no intention of throwing herself at anyone, but she couldn't resist looking in the direction Brenda indicated.

At a table near the door, a pair of women were gazing intently, almost hungrily, at the two study groups. They were young—no more than twenty-seven or twenty-eight—tall and willowy, with wide-set eyes, hollow cheeks, and narrow chins that gave their faces an almost triangular look. They almost looked like sisters, but one had skin the color of heavily creamed coffee, while the other was fairer, with blotchy pigmentation that looked as though it came from a cheap tan-from-a-bottle. In combination, their look was exotic—a cross between East African and Eurasian—and Tiffany guessed that they were more likely to be fellow immigrants than relatives.

"Aren't they a pair of odd ducks?" Brenda asked. "I wonder where they're from." Even their attire was out of place. The dark one was dressed in a crisp navy blazer, designer jeans, and a white turtleneck—evening-on-the-town clothes that were too sexy for work, too formal for coffee. By comparison, the fairer-skinned one looked like a character from a vampire novel, with black eye makeup, wine-dark lipstick fringed in black, tight black pants, and a sleeveless,

figure-enhancing top. Even with the weird tan, there were plenty of settings in which she, too, would turn heads. Maybe the tan was some Goth style Tiffany had never seen before.

Tiffany realized she was staring, and pulled her attention back to Brenda. "So who's Julianne?" she asked, just to change the subject.

Brenda laughed. "You really don't pay much attention to the tabloids, do you? The woman's a shark. The moment she set eyes on Patrick, she zeroed in and prepared to chow down. She's starring with him in his latest movie, and the day filming began..."

A few minutes later, Brenda glanced at her watch. "Oh-oh," she said. "Here's hoping traffic's light." She stole a last sip of coffee, made a face, and gulped the rest. Then she gave Tiffany a quick hug and turned for the door, wagging her fingers behind her as she went. "Toodles," she called over her shoulder and was gone.

Tiffany sat a while longer, drinking the cooling remnants of her own coffee and skimming the morning paper. She wondered if Brenda realized how strongly the predatory references she used for the women who shared tabloid space with Patrick mirrored the state of her own social life. Tiffany couldn't remember exactly what Brad's sin had been, but before him there'd been a man whose idea of fun had been dragging Brenda to strip clubs, and she'd let the guy humiliate her that way at least a dozen times before she finally dumped him. Then there'd been one who could never pass a mirror, or even a window-pane, without flexing and preening—plus an endless succession of frat-boy types who'd never grown up. Yeah, Brenda really did draw the wrong type of men. Or maybe most men really were like that, but only Brenda managed to go out with all of them. The more Tiffany thought about it, the more she realized that Randall truly had been the only

semi-decent man to come her way in years. His disappearance really had seemed out of character; that was part of why she'd been so angry. Maybe he'd gone hiking and had fallen off a cliff. Maybe someday a hunter would stumble across his skeleton.

Tiffany shuddered. What a gruesome thought! Maybe Brenda was right, and she *should* throw herself at the chiropractors. The same two study groups came in like clockwork every Friday: eight men plus a woman they treated as a colleague; no wedding rings, no disgusting passes at her or anyone else. In fact, they'd never paid her any attention, but that didn't necessarily mean they'd brush her off. Tiffany had been a graduate student once, chasing a masters degree in applied economics, and she remembered all too well the ability of exams to eclipse all else.

Tiffany glanced at the door and noticed that the two women were still there, barely touching their coffee, gazes still fixed on the students. *Sharks*, she thought. *Checking out the chiropractors. That's why they're all gussied up. This could get interesting.*

She turned back to her paper but the words might as well have been hen scratchings for all the sense she made of them. She was shamelessly eavesdropping, her attention centered in her ears and peripheral vision. The EMT group continued grilling each other on emergency medical procedures, but the anatomy group was winding down. Two of them packed their book bags and exited together, watched not only by Tiffany but also by the women at the corner table. But while their eyes burned so intently it was amazing the men never noticed, neither woman moved or said a word. Wrapped in conversation, the students strode through the parking lot until, spying an oncoming bus, they broke into a trot and disappeared around a corner of the building, heading in the direction of the stop.

A few moments later, one of the two

remaining members of the anatomy group drained his coffee, gave his friend a desultory wave, and headed for the door. As soon as he'd passed the corner table, Tiffany saw the two women nod briefly to each other. The pale-skinned Goth rose and followed the student out the door. Her dark-skinned companion picked up her coffee and sipped at it, but her eyes never left the fourth member of the anatomy group, now chatting with one of the EMT students.

Outside, the first student pulled a key chain from his pocket, heading for the far side of the parking lot. Watching through the shop's broad windows, Tiffany found herself holding her breath as the Goth followed him, only a few paces behind and closing rapidly. Finally, the man heard the footsteps. He tossed a quick glance over his shoulder and may have said something, but if he did, it was merely the briefest of acknowledgements. Unless Tiffany had lost all ability to judge character, the Goth was very much not his type. Then, the two stepped behind a van and passed out of sight.

It was a big van, obscuring Tiffany's view of an entire aisle of parked cars. Wherever the anatomy student had been heading, Tiffany never saw him emerge on the other side of the van. Nor did any cars leave the parking lot for several minutes. When one finally did, the only person in it was an old man.

Meanwhile, the fourth anatomy student packed away his own books and a laptop computer and headed in the opposite direction, toward a back corridor leading to the bathrooms. To Tiffany's amazement, the dark-skinned woman quickly rose, grabbed her handbag, and moved in the same direction, disappearing into the corridor so close behind him that she was practically stepping on his heels.

Five minutes passed, during which neither the woman nor the student returned. Tiffany's coffee was gone, and

even without a traffic jam, she was going to be late for work. She sighed, pulled her own keys out of her purse and headed for the door.

The following Friday, the chiropractic students were again at their usual tables as Brenda and Tiffany made their way through the latte line. Last week's EMT group was at full strength, although they were now tossing around phrases like "cytokines" and "pyruvic acid." The other group was still doing anatomy—arteries and veins this time—but it was missing two members. The two who were present seemed distracted, checking their watches and glancing toward the door between questions.

Brenda had been late enough to work the previous week that this time she left early, and Tiffany decided to leave with her. On the way out, she stepped aside as one of last week's women breezed through the door with nary a glance in her direction. It was the Goth, although she'd ditched the dark lipstick and black pants in favor of a preppy look. She'd also done something about the tan; the pigmentation was more uniform, although the indoor light now gave it a slightly jaundiced hue.

Tiffany gazed after her as she took her place in the coffee line. Whatever changes she'd made in attire, every angle of her body radiated the same intensity Tiffany had seen last week. Tiffany hoped she was ordering decaf. That woman *did not* need caffeine.

Brenda had noticed, too. "Truly an odd duck," she murmured. "Trying to masquerade as a swan, but not quite making it."

A week later, there were only six students: three men and the woman at one table, the same two guys at the other. The week after that, Tiffany counted only five.

Then, there were four: the woman and two men in one group and one lonely man in the other. This time, Bren-

da was in no hurry to get to work. And with Brad an increasingly distant memory, men—even Patrick—were no longer her chief topic of conversation. Rather, she cited statistics about the local basketball team (on an extended losing streak) and the weather (ditto). "Can you believe this is April?" she complained, wrapping her hands around her coffee cup. "It feels like November."

Nearby, the group of three was getting down to business, but the solo student was staring out the rain-streaked window, slowly flipping a pen end over end, tapping first one end and then the other on his unopened anatomy text. One of the members of the other group glanced his way. "Want to join us?" he asked. "We're doing physiology."

The other student shook his head and continued flipping the pen, like a card shark idly honing his dexterity. *Tap, flip. Tap, flip.* In a quieter room the sound would have been irritating, but competing with the café babble, it was barely audible. "Thanks," he said, a couple of pen-flips later. "But I really need to study anatomy." Then to nobody in particular, "Where *are* those guys?"

The physiology student twitched his head: a brief, disgusted half-shake. "Damned if I know. We haven't seen Tony or Jim for a while, either. Some folks are just flaky. They're not even returning phone calls. As far as I'm concerned, they can just flunk out."

A moment later, the door swung open, and the pen-flipper's hand froze, mid-tap. But rather than one of his friends, the gust of cool air heralded the arrival of Brenda's odd duck, and the pen resumed its metronomic action.

The woman had morphed again. Two weeks before, Tiffany had spied her briefly at a table in the far corner: a cow-girl in faded jeans, checked shirt, and an honest-to-goodness Stetson. The following week, she'd gone for a tight red-and-black sweater and a clinking load of Native American jewelry: amulets, pendant, beaded earrings—the works. Now, she

was a shivery-looking summer girl in a short, sleeveless sundress, sandals, and a broad-brimmed straw hat, dripping around the edges. *What on earth inspired her to wear that?* Tiffany wondered. *Didn't she hear the forecast?* But at least she'd finally gotten the tan right; her skin looked as though she'd spent the past week in Acapulco. From her attire, maybe she thought she was still there.

Brenda was talking basketball; the playoffs were looming and the team was in big trouble. Brenda was a huge fan, so it was easy for Tiffany to nod in the right places while continuing to watch the drama playing out around her. The former Goth wasn't halfway through the coffee line by the time the solo student decided to call it quits. Once he'd made up his mind, he wasn't one to waste time. In a series of rapid moves, he stuffed away his textbook, shoved back his chair, shrugged into his coat, and headed for the exit.

The Goth-in-a-sundress reacted nearly as quickly. She peeled out of the coffee line and was in pursuit practically before the door had swung shut behind him.

Tiffany's curiosity was at the breaking point. She pushed back her own chair, barely remembering to grab her raincoat. "Scuse me," she said to a startled Brenda. "I'll be right back."

She scampered for the exit, then followed at a discreet distance, pretending to be looking for her car. But she needn't have worried; the Goth had eyes only for the anatomy student. He was headed for the bus shelter, and as he rounded the corner of the building, the Goth picked up her pace. The student never noticed. Despite the rain, he'd pulled out a stack of index cards and was flipping through them as metronomically as earlier he'd been flipping his pen. The gesture looked angry, and he was cycling through cards so rapidly Tiffany doubted he was learning much. The Goth was totally focused on the stu-

dent and neither of them noticed Tiffany, who stayed well behind, slightly off to one side so that if they did look back they might not realize she was following.

What a weird pair, she thought. *She hasn't a chance with him, but she acts as though everything's under control.*

Then suddenly, everything changed. The bus stop was three blocks away, across a park-and-ride lot that had long ago filled with cars and emptied of people. Midway across, the chiropractor altered course to angle between two large vehicles. Even as Tiffany remembered how an earlier student had disappeared behind a van and never emerged, the former Goth reached into her purse—a voluminous string handbag that could have held all of the anatomy student's books and notebooks with room to spare—and extracted a pistol-shaped object with a fat handgrip and a bulbous barrel.

Tiffany had never thought of herself as brave. But now she found herself sprinting toward the weapon without conscious thought. "Look out!" she shouted as the Goth belatedly heard her footsteps. "She's got a—" Only it wasn't a gun, it was some kind of electronic gadget with blinking lights and buttons, like a home-theater buff's fantasy remote control mated to a miniature bullhorn.

Whatever it was, Tiffany never managed to complete her warning. The world pulsed, then vanished, and she felt herself dropping into an endless void. She tried to scream, but there was either no air for screaming, or nothing to carry the sound, or maybe she was already unconscious and hadn't quite figured it out.

Then awareness vanished as well, and even the nothingness winked out.

She awoke to sound emanating from blackness.

"It's not my fault," a female voice was saying. The accent was odd, but the lan-

guage was English, and even in the blackness, Tiffany knew it had to be the Goth. "She just appeared from nowhere and tried to grab the 'sporter."

An older voice, also female, interjected. "Don't give me excuses. You got lazy. According to the log that's the fourth time you hit that loc' after you and Stacyn went there tandem."

"*Lazy!*!" The Goth's voice was indignant. "I've never worked harder in my life! Between all those snatches and the processing, I've barely had time to sleep."

"Okay, not lazy—greedy. Greedy, arrogant, and stupid. *Stacyn* was smart enough not to go back, but you kept it up, again and again. How stupid can you get?"

"Stacyn's a wimp." Beneath the indignation, the voice carried an undercurrent of deeper frustration. "The loc' was perfect. All those prospects go there week after week. The place is loaded with them!"

"Not to mention all the other regulars. What, did you think your 'guise was so perfect nobody could ever see through it? Look at this fem." Something that felt uncomfortably like a shoe nudged Tiffany in the ribs. "If she's the norm, you really glommed the wrong dress code. I should put you on probation for the rest of your life. Hell, I should make sure you never get into the field again, *ever*."

The Goth voice dropped both the frustration and the indignation. "But I got you five snatches! Six, if you count the one Stacyn nabbed. I bet some are already out of the Bubble, right?" There was a vague sound that must have been assent because her voice gained confidence. "And whose idea was it to sim' the chro-warp on grad students?" A pause. "Well, Stacyn helped with the math, but the *idea* was mine. It was brilliant, and you know it."

"I never said it wasn't." The older voice had become too calm, reminding Tiffany of the worst scoldings she'd re-

ceived during a short-lived bad-girl episode in grade school.

"Damn right," the Goth said, oblivious to the danger. "And it worked. There's been almost no warp on any of the snatches. The college just admits more students and by the time the warp gets to us, it's negligible."

There was a long pause, probably accompanied by the steeliest of supervisor's glares. "Maybe I should do the same with you," the older woman eventually said. "Hunters aren't irreplaceable, either."

"You wouldn't?" This time it was definitely a question. "There were eight good prospects back there, and I'd have had them all if this bitch hadn't shown up." Tiffany felt another nudge in the ribs, much less gentle. "If it weren't for her, you'd be giving me a bonus."

The older voice sighed theatrically. "No. Stupid is still stupid, even when it's also lucky. You were lucky, Dannette, that this temp wasn't a cop with a gun. Lucky that that low-field 'sporter didn't just get half of her. Think of the chro-warp mess *that* would have made. I guarantee you *I* wouldn't have been the one who spent the next six months patching it."

The Goth attempted another comeback, but Tiffany was having trouble keeping up with the conversation. The world was finally returning to her—or more precisely, she was returning to it—and she was becoming aware of senses other than hearing.

Pain was one of them. She was lying awkwardly on her side, on something cold and hard. It was smooth and dry, so apparently she was no longer in the parking lot. Her arms and legs were cramped, her shoulder and the point of her hip felt bruised, and an urgent pressure in her bladder suggested that she'd been unconscious long enough for the coffee to start doing its thing. Her head, too, was starting to throb, and she wished she hadn't left her purse with Brenda, along with the bottle of ibupro-

fen it always contained.

The thought of Brenda, waiting in the coffee shop, brought a different pang, and Tiffany decided it was time to see what she could do about getting back into action, preferably before that Dannette creature hauled off and kicked her good.

The blackness was her first concern. Briefly, she wondered if she was blind. Then she found a simple solution: with effort, she summoned enough energy to open her eyes.

The hard surface proved to be an institutional-tile floor: brick-red hexagons receding toward curving walls. She tried to turn her head, but her neck muscles weren't yet hers to command. She could see enough, though, to tell that she was in a large, under-furnished room, somewhere on the spectrum between a yurt and a geodesic dome. The walls and portions of the ceiling she could see produced a mild, uniform glow from some hidden source of illumination. Or maybe they themselves were glowing.

It was hard to figure out the scale of this structure because it was so empty, but the nearest wall seemed no more than forty or fifty feet away. Between her and it, the floor was scattered with debris: dirt, rocks, and melted-looking chunks of metal, strewn like jacks tossed by a giant hand.

Two pairs of feet stood in front of her, one tanned, bare-legged, and shod in sandals, the other wearing iridescent green boots and matching stretch pants. With a renewed effort of will, Tiffany tried to turn toward the bodies attached to the feet—an action that magnified the throbbing in her head and sent stars pricking across her newly recovered vision. But her muscles now answered the call, and her head rotated enough to reveal two figures: the sun-dressed Goth, close to her, back turned, and the supervisor—another woman with the same triangular face and Afro-Eurasian features, but the coffee-au-lait complexion

of the Goth's one-time companion.

Compared to the supervisor's attire, even Dannette's strangest outfit had been positively ordinary. Above the boots and the skin-tight fabric covering her calves, the supervisor's jumpsuit bellied out in a collection of puffy ribs, like the compartments of an air mattress, running from knee to hip on the front, back, and sides. Higher up, the ribs were replaced by concentric circles—largest at the hip and bust, narrowest at the waist—the overall effect reminiscent of a set of children's play rings stacked into an hourglass shape on a narrow spindle. But the *pièce de résistance* was the hairdo: a medusa-headed array of foot-long dreadlocks sticking out at random angles under the influence of starch or static electricity or heaven alone knew what. If this was what passed here for a business power suit, no wonder Stacyn and Dannette hadn't found it easy to pick up the subtleties of coffee-shop attire. The supervisor wore no makeup and was of indeterminate middle age. Her mouth was a pinched, narrow-lipped gash. All in all, not a sight to inspire confidence.

Tiffany may have groaned, or perhaps it was the motion of her head that halted the conversation going on before her.

"Ah," said the supervisor, "Sleeping Beauty returns." She gave her underling the full benefit of the medusa-head hairstyle. "Leave us, Dannette." And then, ominously. "We'll finish this another time."

Ten minutes later, Tiffany was beginning to feel at least semi-human. The supervisor, who'd merely said that her name was Tancy Ngawa—*Dr.* Tancy Ngawa—had shown her to an alcove in the yurt-dome wall. There, in a surprisingly ordinary bathroom, Tiffany answered the call of hours-old coffee, splashed water on her face, and tried to jolt her mind back into motion. Her headache was receding and felt more

ANALOG

like a hangover than a concussion. She suspected that she was a simple pill away from having it disappear completely, but *Dr. Ngawa* hadn't offered anything and Tiffany wasn't about to ask. Other than the headache, she had a couple of scrapes but no major bruises, cuts, or broken bones. By the time she emerged from the bathroom, she was again a going concern.

Dr. Ngawa did something to the wall, and it extruded a white table and two simple armchairs. The older woman seated herself in one of the chairs and waved Tiffany to the other. It looked no more comfortable than a cheap folding chair, but when Tiffany lowered herself into it, it conformed perfectly to her posterior. Curious, she pressed her hand against a corner of the seat as firmly as she could, but the material did not deform under the pressure. It felt neither warm nor cool, smooth nor coarse. *Solid* was the only descriptor that unambiguously applied.

"Welcome to the twenty-fourth century," Dr. Ngawa said, relieving Tiffany of having to ask the obvious question. Oddly, she didn't feel surprised. Something very strange had happened to her, and time travel was as good an explanation as any.

"Or maybe 'not-so-welcome,'" Ngawa continued. "I'll be honest. We don't want you here any more than I'm sure you want to be here. But unlike *some* people"—Tiffany knew who that had to be—"I don't blame it on you."

Tiffany said nothing. She had a million questions, but at the moment there didn't seem to be much to say.

A heartbeat later, Ngawa continued. "Although your presence poses certain, uh, problems, let me assure you that you will be well-treated. I don't yet know what we're going to do with you, but we're not barbarians. We won't take you out and shoot you, or anything like that."

It hadn't crossed Tiffany's mind that she might be in danger: an oversight

that made the reassurance less than optimally reassuring. There's nothing like being given a reprieve from a fate you never thought to worry about to make you wonder what else you might be overlooking. Tiffany decided it was time to take a more active role in the conversation: to demonstrate that she was a living, thinking human being.

"So where is this?"

Ngawa gave her a taste of the contempt she'd lavished on Dannette. "I thought I told you. You're in the twenty-fourth century. February 8, 2327, to be precise. Roughly 1600 hours, local time."

Tiffany did her best to ignore the rebuke. "No, I mean where am I, physically? What's this building? What happened to the chiropractic student and why did—" She started to say *Dannette*, but thought better of letting Ngawa know how much she'd overheard. "Your"—*hunter* wasn't any better, and *Goth* was probably meaningless in this culture—"young woman . . . point that . . . *thing* at him?"

Ngawa had a very world-weary sigh. "It's complex," she said, "and I don't know how much you'll be able to grasp."

Try me, Tiffany thought. *If I could get As in applied economics, I can handle more than you think.* But she merely folded her hands on her lap and waited. She may have spent an unpleasant year playing Bad Girl, but she'd put in a lot more time as Good Girl and knew the latter was the way to get results.

Ngawa sighed again. "You're in what we call the Bubble. Think of it as a temporal isolation ward where we put people while we figure out what to do with them. Here, you're effectively out of the time stream, where your presence won't cause . . . disturbances.

"You're here because Dannette was cocky—a shortcoming for which she *will* be disciplined. The device she was trying to use when you interrupted her was a temporal transporter. Normally,

she would have used it first on her . . . quarry, then on herself. But when you jostled it, you must have defocused the confinement ring so that it brought all three of you at once, plus"—she frowned at the debris on the floor—"all this other junk.

"As for *why* you're here—our society is . . ." Ngawa had a disconcerting habit of pausing while she sought just the right words. Words, Tiffany suspected, that were calculated to convey no more information than necessary. "... short of males. Badly so, in fact. The cause is a"—again the pause—"plague. One that depleted the male population by perhaps 99 percent. Maybe more. Statistics from that era are somewhat . . . lacking." In addition to her too-precise choice of words, Ngawa was avoiding the slang she'd so lavishly tossed around in her dressing-down of Dannette. It came off as condescending: *you're too stupid to understand me unless I lay it out very, very carefully.*

"Our solution," Ngawa continued, "has been to . . . import males from the past. I work for a company that uses this method to provide mates to the women of our era."

Tiffany was aghast. "You mean you abduct men from my time and sell them into slavery here?"

Ngawa's smile carried no more warmth than her sigh. "Hardly. We educate them. We find them work. We offer richer and fuller lives than anyone could possibly obtain in your paltry era. Some resist, but most come to appreciate it. You could think of us as a . . . a high-class dating service. We make desperate women very happy. And there are enough desperate women that the men usually have many options. Once they've been here a year or two, few complain."

Maybe they just give up, Tiffany thought. Although with multitudes of women fawning over them, some might actually be happy. Ngawa's clientele would have to be pretty desperate,

though, to want Brenda's frat-boy types. "So how do you make sure the men are . . ." It was Tiffany's turn to grope for words. "... deserving of your clientele?"

Ngawa waved a hand dismissively. The fingers were thin, tapered, and devoid of nail polish. "Oh, that's easy. Once we've identified a prospect, we check him out in the archives. It's truly amazing how many records your Internet left us: college transcripts, criminal proceedings, credit histories, vast stores of the most mundane e-mail. Of course, we usually take men when they're young, before they've actually done most of what we see in our archives. But the potential is still there. We work under the presumption that if a man was destined to become what you would call a 'good one,' then he will do the same in our era. We're rarely wrong.

"And that brings us to your first question, about the Bubble. When we sn—bring people here, we've interrupted the lives they would have led. Before we built the Bubble, we had to be very careful who we chose to transport. And, after we brought them here, we just had to live with the chronological consequences—which, thankfully, were usually minor. History has a way of correcting itself. But with the Bubble, we don't have to be quite so cautious. As long as a new arrival remains inside, we have time to figure out exactly how much disturbance his transport may have wrought and take corrective action to mitigate it."

"So, what about me?"

"To be honest, you're our first accidental transport. Well, we got a dog once, but that hardly counts. Bringing you here created considerable temporal strain—what we call chronological warping—and while you were asleep, I dispatched a field team to try to figure out what's involved. Meanwhile, we'll need to keep you in the Bubble."

"What if I want to leave?"

"Sadly, you have no such choice. Even my staff cannot go Outside whenever

they choose. Everyone involved in time travel accumulates some amount of chro-warp, and it's more efficient to wait until an employee comes up for furlough and patch all of that warp then, rather than doing it piecemeal. I realize that's not what you'd like to hear. Or how you'd like to spend the rest of your life."

Tiffany gaped. "What, you mean I'm trapped here forever? What about this chronological fix-it team you're talking about? Or better yet, why can't you just send me back where I came from?"

Whatever she was a doctor of, Ngawa had no bedside manner. "They will do what they can to assess the chronological damage. But they are unlikely to find a simple, inexpensive patch. I did tell you that you are an unwelcome guest. We can feed you, house you, and find ways to keep you busy, but we do not have infinite resources for addressing your situation, even if it is addressable. That, unfortunately, is the reality you stepped into when you interfered with our retrieval operation.

"Your confinement isn't a punishment. It is for everyone's protection, including your own. If you were to step Outside, the warp would release itself as chronological sideslip. Minor sideslip is no great concern. In my quarters is a photo taken of me when I first came here. In it, that mole," she touched her left cheek, "was over here." She shifted her finger a couple of inches higher, toward the corner of her eye. "I have no memory of it ever being anywhere other than where you now see it. The change must have occurred as a result of an imperfect temporal patch before I took my first sabbatical.

"Such things aren't serious, even if they are disconcerting. *You*, however, are a different matter. While you were unconscious, Dannette ran a temporal scan on you—one of the few intelligent things she did in this whole mess—and found that you are truly *loaded* with chro-warp. Nobody knows why, because

she then ran an archive search on you and found no indication that you would have been important. Frankly, you're very scary. If you stepped Outside without us having patched the warp, one of two things would happen. Possibly, you'd release all of that strain in our era. That would involve a lot more than the rearrangement of a few moles. More likely, you would simply vanish, the victim of your own chro-warp. Either way, we can't risk it unless the investigative team finds an easy, complete patch, and that's not likely. And frankly, we don't have any need for you on the Outside."

Something chimed. Ngawa extended a finger toward the table and a section of its surface faded to a transparent framework for an array of tiny images. At another finger-point from Ngawa one of these blossomed to three-dimensional life. From Tiffany's side of the table, the image was meaningless—the back of someone's head and flashes of what appeared to be featureless walls, possibly from another domed yurt-room but more likely from something smaller. Perhaps an office.

Ngawa was apparently privileged to a voice message that skillful acoustics prevented Tiffany from overhearing. The older woman nodded twice, said "yes" once, and "about time" on another occasion. Then, at a quick gesture from her, the image collapsed into itself, and the table was again a table.

For a long moment, she gave Tiffany an appraising look, but said nothing. Tiffany, having nothing to say, matched the doctor's silence. One advantage of living by herself for many years was that it had taught her how to be alone with her thoughts, and silence was not a habit Ngawa's presence encouraged her to break.

Apparently, Tiffany's reaction was acceptable. "I think I have a job for you," Ngawa said. "It won't help you get out of the Bubble, but it will give you something useful to do."

Ngawa rose from her chair, and with-

out any obvious signal, it and the table melted back into the wall. "Come," she said, and Tiffany rose too, watching her own seat fold itself out of sight. The twenty-fourth century certainly had some interesting materials.

The Bubble proved to be much larger than the yurt-dome that had been all that Tiffany had seen so far. "We use the domes for arrivals," Ngawa said to Tiffany's question. "We don't have to—the transporters can go wherever we want, but the domes make good targets and have certain . . . useful equipment."

They continued through a maze of corridors with the complexity of a research hospital, but Tiffany sensed that even this was only a fraction of the entire establishment. At least her prison would be large enough to provide room to wander—presuming, of course, that she wouldn't simply be locked down in a small segment of it. There were no windows. Perhaps the facility was underground, but Tiffany suspected the design was intended to keep people's minds from straying to an Outside that was off limits to those not blessed with furloughs.

The corridors were alive with people, mostly but not entirely women. Tiffany wondered just how many men were being imported. She asked, but Ngawa ignored the question, so she occupied herself by studying the other people in the corridors. Most were of the same Afro-Eurasian race as Ngawa and Dannette, and many were nearly as outlandishly dressed as Ngawa, although without the supervisor's in-your-face aggressiveness. A few, always female, were wearing attire that would have at least vaguely passed muster in Tiffany's era. Presumably, these were the actual time travelers. At the sight of them, Tiffany realized for the first time that Brenda and everyone else she knew was long dead. But the realization was purely intellectual. Whatever her mind told her, it *felt* as though Brenda was still waiting in the coffee shop, as alive as ever. *You're*

in denial, she thought, and wondered when the reality would sink in.

Meanwhile, Tiffany was beginning to realize that Ngawa was far more than a supervisor. Everyone they met deferred to her, and a few called her "director" rather than "doctor."

"What are you director of?" Tiffany ventured the third time she heard the honorific.

That question Ngawa was more than willing to answer. "Twenty-first century operations," she replied. "Which for the moment are largely confined to three decades, beginning about ten years before you . . . met . . . Dannette. That's a small fraction of the Bubble's total staff, but most of the rest is research, maintenance, administration—that kind of thing. I also oversee our subcontractors, most of whom are historians who lease space from us. There aren't many of them. Patches and Bubble time are expensive, and historians have a habit of sticking their noses into situations that provoke a lot of warp. If they ever want to go back Outside afterward, they need to be well funded. Most can't afford us."

"So it's just the historians and the, uh, mate importers?"

"Mostly. We also lease space to artifact-retrieval specialists seeking lost works of art. Those folks have money but they need a *lot* of supervision."

I bet, Tiffany thought, but Ngawa had arrived at their destination.

"In here," she said, and a door irised in front of them. Ngawa stepped aside and motioned Tiffany to precede her.

Inside, she found something that looked much like a twenty-first century conference room. Like the yurt-dome, it was sparsely furnished, with nothing but a hospital-style bed and another table-chair combo, all made of the same featureless white substance. More furnishings undoubtedly resided in the walls, for those with the know-how to summon them forth.

On the bed lay the chiropractic student Tiffany had followed into the park-

ing lot, either three centuries or a few hours before, depending on how you looked at it. Two other people were with him: Dannette and a woman Tiffany initially took to be a technician but who proved to be a medic.

"He was coming out of it when I paged you," Dannette greeted them. She'd changed from her sundress into a baggy jumpsuit. "But he seems to have relapsed." No apology, no indignation. Whatever was going on *here* was apparently not her fault, and she knew it. "Trish has no idea what that means."

Trish nodded and Tiffany was intrigued by how automatically the medic deferred to Dannette. Was that a clue to the real conflict between Dannette and Ngawa? Two dominant personalities vying for space? If so, staying in fly-on-the-wall mode wasn't a good idea: Tiffany might wind up spending the rest of her days as yes-girl to both of them.

"So, why is he unconscious in the first place?" she asked, forcing Dannette to acknowledge her existence. *I am not apologizing to you*, she thought with an intensity she hoped Dannette would notice. *Whatever you may think of me, I did nothing wrong*. But her voice remained as level as she could manage. "I mean, *he's* unconscious. I was unconscious. But you've obviously been awake for a long time."

The medic started to speak but Dannette silenced her with a glance. Ngawa was tight-lipped, observing—safe, in her role as director, to assume whatever mode she wanted. Dannette switched her glare back to Tiffany, and for a moment, it was a battle of wills—Dannette angry, challenging; Tiffany striving for bland expressionlessness. *Show them there's iron in the Good Girl, but don't overplay it*.

Dannette was the first to relent. "Shit," she said. "Okay. That's a fair question." Ngawa remained aloof. Yes, they were both dominant personalities, but there were differences. Dannette clearly *felt*, and Tiffany much preferred that to the

director's calculating detachment.

"It's a safety protocol," Dannette said. The 'sporters can be set to stun the quarry for about fifteen minutes, so we have time to move him to a recovery room before he wakes up. It reduces the chance he'll injure himself, or us, by trying to run or fight the moment he arrives. The person using the 'sporter isn't in the path of the stun beam.

"As for why he's still unconscious, nobody knows. You really snarfed up the controls when you clobbered me that way. That's why we moved him here, to the med unit. He should have awakened hours ago."

Some of the anger returned to her voice. "You, I was happy to leave on the floor of the homing dome, and I hope you have the cramps to show for it." Dannette stretched her arms behind her back, then massaged a shoulder. "You knocked me completely off my feet before the 'sporter fired. I bet I'm black-and-blue for a week."

Dannette returned her attention to Ngawa. "So now what do we do?" Both women turned to Trish, and there ensued a discussion over whether it would be wiser just to wait for his brain to reorganize itself after the atypical stun or to jump-start it with some kind of electrical stimulator. As the technical talk ebbed and flowed, Tiffany watched the chiropractor. Was he breathing faster than before? She tried to remember what it had felt like to lie on the floor, paralyzed. Headache, confusion, uncertainty—those had been foremost. Fear would also be logical. Accelerated breathing might signal any of these.

"You know," Tiffany interrupted, and all eyes swiveled to her. "He can probably hear you." She drew a deep breath, then surrendered both it and her secret—the small, probably irrelevant advantage she'd been attempting to hoard. "I could."

She felt like a bug under a microscope. *In for a penny*— "Yeah, I know all about 'hunters' and 'snatches' and

'prospects.'" She singled out Dannette and again practiced her poker stare, although her heart pounded wildly. "And I know you think I'm a bitch."

Amazingly, Dannette laughed. It was merely a short bark, but briefly there was a hint of an almost-smile. "Touché."

Tiffany moved to the chiropractic student's bed and took his hand, though she wasn't sure he could sense the touch, even if he could hear. "Whatever you feel like right now," she told him with more assurance than she felt, "it's temporary. The same thing happened to me, and I'm fine." Well, that was debatable, but her problems had nothing to do with being stunned. "It just takes time."

The student's eyes remained closed, although Tiffany thought she detected the faintest flicker in the lids. Or was that an effect of the stun? She squeezed his hand and attempted to persuade herself that she felt a feeble pressure in return.

Then Ngawa interrupted. "That's your new job," she said. "Think of yourself as the welcoming committee for problem cases."

The chiropractor must have been coming back to consciousness because this time his hand did indeed spasm.

"Shhhh," Tiffany soothed, looking daggers at Ngawa. "You're not a problem case and they're not going to hit you with that brain-defibrillator thing. I won't let them."

Weeks passed, and Tiffany ministered to an endless string of new arrivals. The chiropractic student had been one of the easiest because his main problem was the stun. When he finally came out of it, Tiffany asked Trish to do something for his headache, then insisted it take the form of a good, old-fashioned pill rather than a zap from the nerve stimulator, which Trish insisted would be quicker, perfectly safe for that purpose, and more effective. As a rule, chiropractors aren't big fans of pills, but having

an unknown device tamper with your brain is even worse, and when Trish grudgingly conjured up what looked much like a pair of aspirin, the student gratefully accepted.

"I know you," he said a few minutes later. He was still lying in the bed, but it was obvious that he'd soon be on his feet. "You were in the coffee shop on 102nd Avenue, with that tall brunette."

Poor Brenda, Tiffany thought again, and wondered how she would find time to grieve her own losses while trying to help everyone else. Probably the way she was not-handling it right now, by ruthlessly shoving it aside. "What else do you remember?" she asked, then spent the next several minutes assisting him in piecing together the memories that would help him make sense of what had occurred.

Other cases were more difficult, and sometimes "problem" ones came in such rapid sequence that Tiffany only had a few minutes apiece for them. She would never forget a man who'd viciously attacked not only his hunter but two technicians, a medic, and any breakable-looking object in reach. He was in restraints when Tiffany arrived, but he'd still managed to spit in her face, and Tiffany—whose sympathies were usually strongly with the men—pitied the indoctrination team that would have to work with him.

Often, she worked double shifts, and by the time she stumbled to her sleep quarters, she was dead on her feet. Eventually someone, probably Dannette, intervened and she was assigned to only the neediest cases. It was still intense, but the hours were more reasonable and she had more time to be of true help to those who most needed her—a sort of twenty-first century ambassador doing what she could to ease their transition into the future: a future in which *they*, at least, would find themselves welcome.

Dannette's intervention didn't completely come by surprise. Part of her

punishment had been to serve as Tiffany's orientation guide during what were supposed to be Dannette's off-duty hours. It wasn't a punishment designed to alleviate the hunter's hostility, but she had attacked the new duty with the same intensity she brought to everything else, and gradually the two built a grudging respect.

"I can't get over the scale of this operation," Tiffany said one day, when Dannette joined her for lunch.

Another part of Dannette's punishment had been to be put on patch duty. She'd described it, succinctly, as "boring as hell," but beneath that comment Tiffany read a realization that for the moment at least, the older dominant personality had secured a victory. That morning, Dannette had spent two weeks' subjective time in 2019, hacking databases—most patches, she had previously said, involved little more than data manipulation—and living alone in a safe house. The solitude had made her talkative. "Last year, we did about 100,000 snatches," she said. "The year before, we took only half that many." Unlike Ngawa, Dannette never resorted to euphemisms. She was a hunter, not a retrieval specialist, the men were prey or quarry, and the transportations were snatches or even snatch-and-grabs. At first Tiffany thought Dannette was trying to shock her, but even so, her directness was better than Ngawa's verbal tiptoeing. Now, even Tiffany was using Dannette's terminology.

"Ten years ago," Dannette added, "there was no Bubble, and snatches were essentially unregulated. Nobody knows how many there were, but probably only a few hundred. But there's an outfit twenty years in the future that appears to be taking about fifteen million per year, mostly from a few years ahead of you. We clashed with them a couple of times in the field, then sort of divided the decades up between us. Ngawa's afraid they're a competitor who's going to horn in on our business, but I think

they're us, as we're going to become." She speared a forkful of salad. "Hopefully, without Ngawa. That woman's a menace." She chewed a tomato slice. "Damn, this tastes good. That stupid safe house was stocked only with canned goods and pasta, and Ngawa would have had my hide if I'd hacked a bank and gone to the market for some real food. How the hell could you people eat that way?"

"Most of us didn't," Tiffany said.

Still, she was unimpressed by twenty-fourth century cuisine. Healthful and nutritious, no doubt, but a little lacking in flair. Maybe the female-dominated Bubble had given the nutrition police unchallenged sway. So far everything she'd seen had looked like health food. She had nothing against salads, but these people seemed never to have heard of salad dressing.

With time, the lunches became routine, and sometimes Tiffany and Dannette sought each other out simply to socialize. One thing the nutrition police hadn't managed to preempt was alcohol, so one evening Tiffany let Dannette introduce her to twenty-fourth century beers.

In Tiffany's era, the name of the game had been microbrews, and every pub seemed to have its own house brews. In Tiffany's circle, it was a standing joke that anything that appeared in more than two pubs couldn't truly call itself a microbrew. *Milli-*, perhaps, but not *micro-*.

Dannette lived in the world of brew-to-order. You described what you wanted, waited five minutes, and presto, the wall extruded it. "It's better on the Outside," she said, "but the Bubble does okay by us. Though you do have to get used to the fact that the Bubble has no waiters."

"Yeah," Tiffany replied as she sampled her first beverage, which Dannette had ordered for her as rich, dark, aged, and oaken, with a hint of maizel—whatever that was. "Gene-modified something,"

was the best explanation she could offer, followed by: "Trust me; I've spent time in a few of your pubs. It'll taste like a better-grade stout." Which proved to be correct.

"So, I take it that here," Tiffany laughed, "talking to the walls isn't a sign of insanity."

Dannette laughed, and Tiffany realized that hard edges and all, Dannette reminded her very much of Brenda. "Here, that expression would be taken literally," Dannette said, "and people wouldn't have a clue what you meant. Though, the Outside does have real restaurants with real table servers." Her smile faded. "In fact, bartending is one of the things men from your era often wind up doing. It's a relatively easy skill to learn, and bars with male bartenders or restaurants with honest-to-goodness waiters are in high demand."

Tiffany took the opportunity to follow up on Dannette's shift of tone. "Why did you become a hunter?"

"Why not?" Her voice carried more than a hint of defensiveness.

"I wasn't criticizing. I'm just curious. I mean, you're obviously brilliant, industrious—if I may say so, *driven*—and unless I miss my bet, ambitious. So why lock yourself away in here? Are you trying to snag a man of your own?"

This time, Dannette's laugh was bitter. "Hunters don't get to sample the wares. Not that the wares are in a mood to be sampled by those 'at pick 'em." She took a long draught of her beer, gazed at what was left, and ordered another. She swirled the remaining liquid in her glass and watched it spiral in amber vortex. "Snarf it," she said at last. "Okay, I've never told anyone this, and if you tell *anybody*, I'll, I'll—I don't know what I'll do, but I'll make sure you don't like it."

"Cross my heart," Tiffany said. Then grinned. "If *that* means anything today."

"It doesn't, but *I* know it." Dannette drained the remainder of her beer and stared accusingly at the wall, which had

yet to deliver the follow-up. The wall remained a wall, and she looked back at Tiffany. "You're right," she said. "I'm a certified genius. IQ of I don't know what. But my parents—oh gads, I wish someone had 'sported my father off to the future when I was about two. Not that anyone would have had him. He was a math teacher until he got fired for flunking some gosh-awful fraction of his students. Ninety percent or something like that—I never really got the full story." The second beer arrived and Dannette snatched it. "Nothing was ever good enough for him, and he treated me the same way he did his students. Worse, because I was *his* daughter and *supposed* to be outstanding."

Dannette drank half of her second beer in a single long pull. "Not exactly a unique story," she said.

Tiffany thought of Brenda and her succession of frat-boy hunks "No. It seems to be timeless." She wondered if everyone is fated to dance to the tune of former traumas. Which brought a new thought: to what traumas was she herself dancing?

"An old story," Dannette agreed. "But damn, it hurts when it's you." She took another big swallow of beer and glanced at the wall. Started to order, then changed her mind. "Some people drown such things in alcohol. Me, I ran off to the Bubble, where the bastard doesn't even know where I am unless someday I'm stupid enough to call him on the V-phone." Another swig of beer. "Which I won't be." She looked again at the wall. "Oh, hell, sometimes drowning's not all that bad." She finished most of her second beer, then ordered a third. The alcohol was beginning to take effect, but her eyes burned as intensely as ever. "And look what happened when I got here," she said. "I wound up working for his female counterpart." She finished the second beer. "Ain't that what you'd call ironic? The psychists . . . what did your people call them?"

"Psychologists."

"That's it." Dannette's voice was beginning to slur. "The *psychologists* would have a field day." She stared into the empty glass. "I tell you, in twenty years, I'm going to *run* this place. That outfit I told you about in the future? That's gonna be *me*."

Ten days later, Dannette suggested that they meet for coffee. Increasingly, these get-togethers felt like Tiffany's weekly klatches with Brenda—a thought she ruthlessly suppressed. Sometime, she was going to have to come to grips with all of this denial, but there never seemed to be enough time.

Food service in the Bubble was comprised mostly of food courts scattered at strategic intervals through the facility, which, as best Tiffany had been able to figure out, sprawled on several levels over the better part of a square mile.

"It's built a lot like the first moon-base," Dannette said, bringing home to Tiffany the reality of how *much* was going on in the Outside she might never be able to visit.

In addition to the food courts there were auto-service restaurants, such as the pub Tiffany and Dannette had previously visited. The most popular ones required reservations a week in advance, but the tiny alcove that served as a coffeehouse wasn't one of those. "Don't expect too much," Dannette warned. "Your people made coffee into high art. Nothing today is up to that standard, even on the Outside. Here's your chance to feel superior."

The beverage was better than food-court norms but nothing special. "Most of us would consider this to be pretty good," Dannette said, "but I was beginning to get a taste for the difference between good and very good when Ngawa put me on patch duty. Now, I'm lucky to have anything better than instant."

The mention of Dannette's demotion brought up a question Tiffany wasn't sure she wanted to ask. "Speaking of

patches and the Outside, how's it going with getting me out of here? Is there any chance?"

Dannette snorted. "I forget that you don't know Ngawa like I do. She thinks I'm impulsive." She paused. "And I have to concede I've given her reason for that. The month I accidentally nabbed you—have I ever apologized for that?" She hesitated again, and for a moment, Tiffany thought she might actually apologize rather than just talk around the edges of it. But that sort of thing wasn't *her forte*. With a jolt, Tiffany realized that she was probably Dannette's best friend. Dannette, of course, was the closest thing Tiffany had to a friend of any kind. Suddenly, she felt very, very far from home.

The moment passed, and Dannette resumed her story. "The month I nabbed you, I was taking a lot of chances. I've been thinking about that a lot, trapped in those damn safe houses." She shot a glance over her shoulder to ensure that they indeed had privacy. "In fact, I started thinking about it right after that night in the pub, when I told you about my father—well, not until I got over the hangover, but you get the idea. I thought I'd done such a great job of running away from him, but all I did was bring him along with me." She tapped her temple. "Here. 'Gotta be the best or you're no good.' Damn, what rot."

"That type of thing is hard to beat," Tiffany said, thinking yet again of Brenda. Had her friend gone to her grave without ever reaching the same understanding?

"Yeah." Another pause while Dannette blew on her coffee. Cooling it, or just thinking? Gathering strength, it turned out: "And I *know* I never apologized. So here goes—" She sipped the coffee. Burned her tongue and muttered a curse.

"It's okay," Tiffany said. "I know you didn't intend to nab me."

The permission *not* to apologize proved to be the lubricant that allowed

her to force out the words. "Yes, but it was *my* error, not yours." Big pause, deep breath. "I'm sorry I did this to you." More scalding coffee on what must be an already tender tongue. "I wish I'd said that a long time ago. But when you're expected to be perfect, it's hard to admit being wrong."

For several minutes they sat in silence. Then Dannette roused herself. "You should have been a psych counselor," she said. "What *did* you do back ... then?"

"I was project manager for a bunch of engineers."

The old Dannette was returning, and she replied with the familiar snort. "Same difference," she said, then laughed again. "Now there's a weird expression. I've been really working on blending in better: studying my twenty-first century colloquialisms, working on my 'guise—trying to catch the distinction between glamour and reality. Did you notice that I'm no longer dying my skin?"

Tiffany hadn't, but now that Dannette pointed it out, Tiffany realized that her complexion no longer varied spectacularly from week to week. "You look good."

"Yeah, a few patch trips ago, I ran across an ad for tanning salons. Most people here don't need them, but if you leave me in the Bubble for a few months without sunlight, I turn positively *fungoid*. So when I got back, I added some ultraviolet to my wall illumination. And gee, it worked a lot better than the dyes, though every time I turn it on, the wall feels obliged to warn me about skin cancer."

The banter dropped from her tone. "But I don't care. If I ever do get back in the field, I don't want to attract the attention of someone else like you." She sucked her teeth. "I never finished answering your question, did I?"

Tiffany shook her head. Though sometimes it was better to help with other people's problems than to find out there were no solutions to your own.

"I thought not. Well, I may be impulsive, but Ngawa's the opposite. She analyzes everything to death, then *still* does the wrong thing. She only got the directorship because her father's important, which is why she brandishes that Ph.D. like it's some kind of weapon. Her degree is in robotics or something like that, which probably makes her a pretty good tech weenie—did I get that term right?"

Tiffany nodded.

"But it doesn't mean she knows diddysquat"—this time Dannette merely grinned—"about temperonics. Or management, for that matter. Me, I'd have zapped both you and that student back to your parking lot long before either of you woke up. *Dare* your folks to figure it out. Pretty safe, because after all, how could they? I even suggested it to Ngawa, but she just sent back that silly study team. If she'd done it my way, there'd have been some baffled people back in your era—yourself included—and some chro-warp, but we've patched worse. Hell, *I've* patched worse. But Ngawa's got no guts, and she let the opportunity slip."

"And now?" Although Tiffany was afraid she knew the answer.

"I never heard, but I'm sure the study team brought back a big fat report that she duly read, then filed. She's a bean counter at heart—if she has a heart. And worse, you've proven useful. She's never going to let you go."

Tiffany stared at the wall beside the booth, wishing she could ask for something stronger than coffee. It was her turn to get drunk. But with nothing available but coffee, overindulgence would mean wakefulness rather than oblivion.

At a distant booth, someone was using the table as a videophone, and Tiffany wished she had someone, anyone, who'd care if she gave them a call. For some time, an idea had been nagging at the back of her mind—another piece of denial she'd been effectively

suppressing—but as she watched the V-phone in action, the thought took sharper form.

"How does that work?" she asked.

"What, you mean nobody's shown you?"

Tiffany shook her head. "People use the V-phone to page me all the time, but I've never placed a call."

"Ohhh. You should have asked ages ago. It's not hard. First, you have to summon up a 'puter port." She made an open-sesame gesture above the tabletop, and it faded into the familiar transparent window. "Then you pick the V-phone icon, and tell it who you want to call. When you're done, you just put it back to sleep." The computer window faded away. "Note that I never had to actually touch the icons. Pointing is enough. It works by inductance." She leaned back from the table. "Now, you try. Any flat surface will work. It knows where you are, so the image is always right-side-up."

Dannette's gesture had seemed simple, but when Tiffany attempted it, nothing happened. She tried again, more carefully, but still the table refused to acknowledge her.

"That's odd," Dannette said. "You could order food and coffee just fine, so it's not as though Ngawa forgot to enter you into the grid. And 'puter access is a basic perk. Give me a moment; let's see if we can figure this out." She shifted to Tiffany's side of the table so Tiffany could watch, and again opened a port. Moments later, she was deep in a database, playing the icons with all ten fingers as easily as Tiffany's could work a keyboard.

"Weird," she said, a few minutes later. "You exist in the system, but only barely. Basically, you're earning a salary—not at a very good grade level, by the way—and you're free to spend it, although I gather you're not doing so."

"What would I buy?" Tiffany asked. Dannette shot her a glance but for once said nothing. "What's odd," she said in-

stead, "is that other than those super-basics, you simply don't exist. There's not even a locked-down file on you—at least not one I can find. I even did a new archive search on you, and you're a blank, which should be impossible. Yeah, you're loaded with unresolved chro-warp, but you were still *born*, and nothing can change that.

"My guess is that Ngawa doesn't want you browsing the public databases. Either that, or there's some truly bizarre sideslip going on. In which case patching you should be a priority: nobody's truly *sure* that sideslip can be contained forever. We're still shooting in the dark when it comes to temporal theory, and anyone who claims to really understand it is a fool."

Dannette backed out of the archival files but didn't close the port. "What was it you wanted, anyway?"

Tiffany hesitated. Did she really want to do this? But the butterflies were already dancing in her stomach, and the answer to one question—unless it, too, had been erased—was merely a few icons away. She drew a deep breath, but it didn't do much to calm the butterflies. "There was a guy," she said. "I dated him a few times, and then he just vanished. I was mad as heck at the time, but I keep wondering whether he might have wound up here. Whether some hunter"—suddenly the word *snatched* seemed as harsh as the reality it described—"might have taken him."

Dannette twitched a finger at an icon, and the port segued to a new field of view. "Easy enough to find out." She glanced at Tiffany with a look that carried the stirrings of something new, something that seemed remarkably like compassion. "If you really want to know."

Tiffany's throat was a dry lump. "Let's go for it," she managed. She gave Dannette a name and a few dates, and watched her fingers fly in the air above the tabletop.

"That him?" Dannette asked, and a

tiny likeness of Randall sprouted from the tabletop.

She gulped. "Yep."

Dannette pulled up a data file. "He was brought here in the early days of the Bubble," she said. "Though he was nabbed from only a year before I tagged you." No hesitations over word choice. Dannette really did prize directness.

"So my guy was one of the first to be snatched?" The butterflies were back, and she tried to still them with a weak attempt at humor. "Kind of unlucky, wasn't I?"

Dannette was learning, but she missed the subtlety of that one. "Not as much of a coincidence as you think. Your city was one of our first test centers. In fact, we're going to have to move on soon, before we deplete it." Dannette flicked through a few more icons. "Here's a contact number on the Outside. Do you want to give him a call?"

The butterflies froze, along with Tiffany's heart. "Is that a good idea?"

"Can't see why not. If Ngawa checks my phone log, I'll just tell her you didn't tell me why you wanted to speak to him. She'd have a cow, but she told me to help you adjust to life in the Bubble, and the V-phone is a standard privilege. So, want to give it a try?" More icon tapping. "He's a couple of time zones away, where it's late afternoon. As good a time to call as any."

Tiffany's heart was now running full speed. "From here?"

"Sure. I'll privacy-screen it for you. Do you want me to leave?"

"No, I think I might need the moral support." Why was this so hard? "Can you watch and listen, but edit yourself out of the transmission?"

"Piece of pie."

"Cake," Tiffany said reflexively, then realized that Dannette had been making a deliberate attempt to lighten her spir- its. One that had worked, at least a bit.

Tiffany may have seen the V-phone in action many times, but its perfect images were one technological miracle

she'd never be able to take for granted. When, moments later, Randall's head and shoulders rose before her as large a life, she couldn't shake the sense that he really was a solid presence, one she would swear she could touch if she hadn't once tried that experiment and proven it didn't work. It merely blocked part of the projection beam and put a death's-head hole in the subject's face—far too close to her one-time fears about Randall for her to try it now.

"Randall Wilkins?" she asked. There was no doubt it was him—a bit fuller in the face, perhaps, with more gray at the temples, but the same powder-blue eyes, square jaw, and perfect teeth. Seeing him now, she felt again the gulf of her separation from all she once called home.

Not only had she never really found time to grieve the loss of her old life, but she'd never fully resolved her feelings about Randall's own disappearance. True, they'd never really been a couple, but the pundits were wrong: you *can* lose something you never truly had. She wondered what the archives had once showed for his future, and whether she'd played a role in it.

"Yes," he said cautiously. "Although nobody's called me that for quite a while." Randall didn't volunteer his new name, and Tiffany didn't want to know.

In addition to changing names, he had adopted twenty-fourth century attire. Now, he was wearing a loose-fitting black tunic with no visible seams, topped by a kaleidoscopic kerchief worn jauntily around his neck. He'd opted for a deep-focus image, allowing Tiffany to see a well-appointed den, furnished with a real wood desk and upholstered armchairs rather than the Bubble's ubiquitous white plastic. In the background, which the V-phone rendered in the washed-out pastels and blurred patterns of an Impressionistic painting, tall windows opened onto a manicured yard. Beyond, afternoon sun glinted off a sapphire lake flecked with

spinnakered sailboats.

Tiffany suddenly felt shabby in her magic-plastic restaurant booth and the twenty-first century attire she still sported, partly for the reminder of home, but mostly because the clothes gave her better rapport with recent transpórtées.

Randall would have had to be blind not to notice the anachronism of her apparel. "I take it that you're calling from the Bubble?" he said.

"Yes." Belatedly, Tiffany wondered whether sideslip could leak out over phone lines. Probably not, or Dannette wouldn't have encouraged the call. But did anyone really know? Would Randall suddenly change before her eyes—mutate into someone else, cease to exist, or simply forget who she was? Tiffany plunged ahead, anyway. "But I'm not calling on Bubble business," she said, hoping she wasn't sounding as silly to him as she did to herself. Was the Bubble the type of entity that could *have* business? She'd never thought to ask the name of the company for which she worked. Now, her subconscious offered up a string of unlikely prospects: Hubbies-R-Us, Snatch-a-Mate, Old-Fashioned Romance, Inc. Why was talking to Randall making her so nervous—she who'd once out-stared Dannette *and* Ngawa? "I'm Tiffany," she said.

Randall blinked uncertainly. Then his eyes widened. "Tiffany *Robertson*?"

She nodded.

"Wow." A long pause. "As in, *really* wow. You were good. Not a single false step. And to think I went through all that grief on your behalf. I even got them to change the patch so you'd get closure." There was bitterness in his voice. "Silly me. You really were good. I never dreamed you were a hunter—or scout or whatever you are. Why on Earth didn't they just tell me you were one of them? It would have been so much easier."

It was Tiffany's turn to blink. "Because I wasn't." This conversation wasn't going at all the way she'd planned. Although,

come to think of it, she really hadn't had much of a plan in mind. Temporizing, she told Randall how she'd come to be here.

"Well," he said when she'd finished. "At least you now know why I stood you up that night. I really did worry about you for months. The hunter who grabbed me later told me she hadn't known that you and I had met yet, that there wasn't supposed to be anyone who'd care all that much if I disappeared. But I was sure you would, which is why I forced them to change the patch."

Too much information, all at once. Tiffany clutched at the fragments and asked the first question that came to mind. "What patch?"

Now, Randall was the one to be confused. "My death. Not much of a body to bury, but a few bones shipped back from here and a fake DNA report to make it look like me. They told me they dropped the bones into a tanker-truck fire that killed a dozen other people. Why *did* they have you call me, anyway, instead of letting me *stay* dead?"

More information overload. "This isn't exactly an official call," Tiffany said, feeling Dannette's presence beside her. "I never heard of such a wreck, and for sure, nobody reported finding your body." Her next remark was needlessly cruel, but there was too much pain to keep it all bottled up. "You just vanished and I never heard a word from anyone."

Randall's face jerked as though she'd slapped it. "Shit," he said. "The goddamn bastards. They stuck with the original patch and . . . and patched *me* with that . . . that *fable*. And I bought it, hook, line, and sinker. Damn, damn, damn. I should have made them *show* me the post-patch archives, though I suppose those could have been faked, too. I'm sorry, Tiff. I really am."

Tiffany forced a wan smile. "I know you are. And it's not as though it matters any more." That was a lie, but it felt better than acknowledging the truth and it

made it easier to ask the next question. "Did they say what their precious archives had in store for us if they hadn't nabbed you?"

Randall's gaze shifted sideways—onto his green heaven through yet another window? "Do you really want to know?"

Tiffany didn't trust herself to speak. She nodded, a new lump rising in her throat. *Ob-ob.*

"Two kids, Golden Anniversary, grand-kids, ripe old age, the whole package." Randall's voice was too steady, as though reciting the phone book. His own way of dealing with the information, she suspected. "If they didn't lie about that, too. By the time they told me anything about you, I'd been booted up to someone named Ngawa, and she seemed a pretty cold fish. Her job was to get me processed, acculturated, and on the market, as efficiently as possible. I was doing my best to resist. We made a trade: she'd answer my questions and arrange a patch that would give you closure. I'd be a good boy and learn to live here."

Tiffany's consciousness was spiraling toward a point near the pit of her stomach. *I will not cry*, she thought. *I will not.* "Did you keep your end of the bargain?"

Randall lowered his gaze. "How else would I be out here?"

"And if you could go back?" The tears were closer than ever.

"But I can't, can I?" Noise intruded in the background, and Randall looked off to the side. "In a moment, dear," he called. "It's someone from the Center, just checking up on me." He turned back to Tiffany. "That's my wife." He held up his left hand, displaying a simple gold band. "For me, it's been seven years. We have four kids. All boys, I insisted on that. Whatever else I do, I won't contribute to the gender imbalance, though I do worry . . . never mind. I'll guard them however I can."

"What about you?"

"I'll manage. I'll have the equivalent of

my GED in a couple of months. I'd have had it sooner, but the boys take a lot of time. There are plenty of jobs I can do once I get it." His eyes carried a wistful look, and he again gazed across Tiffany's shoulder, out the window she was now certain lay in that direction. "Although Regina points out that we don't need the money. She has a Ph.D. in a field that didn't even exist until a few years ago." His eyes flicked back to hers, slid away again, then returned. "I'm glad to know what happened to you but sorry it worked out so badly." Again his gaze flickered between her and the distance behind her, and Tiffany realized that there might be an advantage to her windowless existence. "I hope things go better for you, now," he said, reaching for the disconnect. "But please, don't call again." And then his image collapsed: a bird in a gilded cage—tauntingly replete with windows.

Tiffany leaned her elbows on the table and buried her head in her palms, still refusing to cry. A hand tentatively touched her shoulder. "Damn," said Dannette, and she realized the hunter was also close to tears. "We're not supposed to break up couples. Officially, it creates too much warp. And the men take too long to adapt." She paused. "But that's merely what Ngawa says. It's also just plain wrong." Another pause, then more softly: "I wonder if I've ever done it."

The last thing Tiffany wanted now was another chink in Dannette's armor. She wanted to cry, to hurl things, to blame *someone*. But sometime in the past few days, Dannette had moved beyond being simply the closest thing she had to a friend in this world, and become the real thing. Tiffany reached over and put her own hand atop Dannette's. "It's not your fault," she murmured, wondering how many more times she was going to find herself uttering those words.

She was rewarded with a sniff, then the hand was snatched back and Tiffany sensed motion as Dannette swiped

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away the traces of her weakness. Then Ms. Hard-ass was back in control. "I sure as hell hope not," she said.

That pretty much ended the evening. A few minutes later, Tiffany and Dannette were walking back to the residential wing when the wall chimed and called Tiffany's name. "Here," she said, and found herself facing a V-phone image of a medic she vaguely knew. "Sorry to call you after shift," the woman said, "but we could use you in room 15B."

For once, the page was welcome. Tiffany hadn't been looking forward to spending the rest of the evening alone, and even though she was a long-time caffeine addict, she'd have had trouble getting to sleep this soon after two cups of coffee.

"On my way," she said. She turned back to Dannette. "How much trouble did I just get you into, really?"

"Probably none. Why?"

For a few hundred meters, her route to work was the same as that to Dannette's dorm. The medic hadn't used the word *emergency*, but a call at this hour meant she had a patient she'd prefer not to simply sedate until morning. "Walk with me?" Tiffany said, and started off.

Dannette trotted to catch up. "Sure. What's got you worried?"

"The walls," Tiffany said. "They always know where I am. What else do they know? Is this conversation being recorded? Is *everything* being recorded?"

"No. The walls are an autonomous system. Nobody has access and anyone who got caught trying to hack them would take a quick trip to jail."

"You're sure?"

"Yeah, we have technology that would make . . . what's his name, Big Brother?"

Tiffany nodded.

"... that would make Big Brother look like a tadpole. But this isn't a police state; in fact, our constitutional rights are stronger than yours were. I could stand here and plot open treason, and

the walls not only wouldn't recognize it, they wouldn't react if they could. But if my heart stopped, they'd have a medic here on the run. It's like having a very attentive but brainless nanny."

The case in room 15B proved not to be as much of a problem as the medic thought, and the man relaxed considerably when Tiffany convinced him he was in the future, not a flying saucer. She had dealt with that problem before and could list all the ways his experience differed from the alien abductions he'd read about. But the best solution was the simplest. The first time she'd asked a medic to prick blood from her own finger had taken some fast talk, but its redness had done much to persuade the man of the medic's humanity. Within a week, the other medics were calling Tiffany their resident vampire.

The problem cases continued to come in as fast as Tiffany could work them. Each time she thought she could stand it no longer, her workload would again be eased, but that only meant she saw a greater and greater fraction of truly difficult cases. As more months crept by, Tiffany learned that the system was being continually ramped up in the hope of doubling last year's number not only of snatches, but of "placements"—Ngawa's euphemism-of-choice for marriages. Tiffany was a staff of one, working an ever-more-select fraction of the incoming men.

The worst case proved to be the last. By this time, yurt-domes, recovery rooms, and medics sometimes worked round-the-clock, although most transpotees still arrived during the nominal daytime. This one came in at night and woke from the stun screaming. Even though it was Tiffany's sleep shift, she was paged to the recovery chamber, where she found Ngawa and a hunter she'd never seen before. The hunter was wearing a decent facsimile of a cheer-leading outfit from a decade before Tiffany's time, but Ngawa had made her

usual non-effort to conform to twenty-first century norms, and her fright wig was at its most hideous, with black-and-white bangles that looked disconcertingly like eyeballs affixed to the end of each dreadlocked stalk.

The quarry was a broad-faced young man who'd wedged himself into a corner of the recovery room. Upright and confident, he would have been hulking, but crammed in the corner, knees drawn to his chest, he was a child in a ludicrously oversized body.

He was wearing a football uniform that pronounced him to be a Javelina. An elastic wrap circled his left knee, and water (a melting ice pack?) seeped from beneath the bandage. A trail of moisture marked the path by which he must have scooted crabwise across the floor, en route to the corner. His helmet was in his left hand, gripped so tightly by the chinstrap that his knuckles gleamed porcelain-white.

Tiffany wheeled on Ngawa, ready to give her a dressing-down similar to the one she herself had given Dannette all those months before. Was the woman totally devoid of empathy? But at the last second, Tiffany remembered her place and attempted to clamp a lid on her anger.

It wasn't much of a lid. "Out," she snapped, and to her amazement, Ngawa nodded curtly and followed her bidding.

Tiffany turned to the hunter. "Details," she demanded, and the *faux* cheerleader drew back a step in unconscious reflection of the deeper fear huddled behind her. *Bad start.* Tiffany reminded herself that she had no real authority, and that indignation, however righteous, would carry her only so far. "I'm not blaming you," she said, although she wasn't sure who else there was to blame. "Just tell me what happened."

The hunter bit her lip. Behind the college-girl getup she probably wasn't all that much older than her quarry. Some hunters worked by ambush. Some, like

Dannette, operated more like pickpockets. This one probably relied on the lure of wholesome good looks.

"It was the fourth quarter of the game," she said with a trace of quaver, and Tiffany nodded encouragingly. "He'd wrenched his knee. He didn't know it yet, but it would be the end of his football career." The girl's voice was gaining strength as she fell into the rhythm of a by-rote debriefing. "The real injury would come the following week, when he'd twist the same knee, again, in practice."

"It was a small college, and he was by himself in the locker room, icing his knee, while everyone else was watching the game. I just stepped in, said 'Hi,' and snatched him the moment I was sure he really was alone. End of story. If I'd not taken him, he'd have gone to grad school and become a psychologist, so I know he's got a brain. But after his initial screaming fit, all he's done is crawl in the corner and whimper."

And you view that as weird? Tiffany thought. *You took a man headed for the type of life work that attracts the perceptive, empathic types—the ideal "good ones"—caught him when he'd been abandoned by his teammates, then zapped him here where one of the first things he sees is Dr. Eyestalks. It's a wonder he didn't go catatonic.*

But there wasn't much use in saying any of that. This whole time-travel/hunting thing dehumanized everyone. Dannette was starting to show a soul, but hunters had to abandon a piece of their humanity each time they yanked someone into an alien future—especially when their assignment was to deliberately pick the kindest, most sensitive ones because they were the most marketable "placements."

Tiffany masked her feelings as best she could. "Thanks," she said. "Now, you'd better leave us alone."

As the hunter made a grateful exit, Tiffany turned to the football player. She kicked off her shoes and sat down with

her back to the wall, so she neither towered over him nor squatted on her haunches like an adult speaking to a child.

"My name's Tiffany," she said. "They kidnapped me, too. But they won't hurt you. They're lonely, too."

Hours later, the football player had yet to speak. Nor had Tiffany said anything more, because at this point it would all be hollow. But in the silence, he'd inched closer until eventually she found herself cradling his huge body against her tiny one, as tears rolled off his cheeks and dripped to her sleeve. Tiffany's eyes were also moist, and it took a supreme effort for her not to dampen his hair with tears of her own.

Eventually, his tears ceased. Tiffany's arm was cramped, she'd missed most of her sleep shift, and her stomach was rumbling. Sometime soon, the young man would also be hungry.

"Several things you can have for the asking are comfortable quarters, food, and really good medical treatment for that knee," she said. "They'll also give you fresh clothes, although I won't say much for their fashion sense." She paused. "When you're ready, they'll tell you what's going on. Probably better than I could."

For the first time, the football player met her eyes. "Thanks," he said: a single word in a surprisingly soft voice. His massive hand gave her shoulder a near-painful squeeze. Then he levered himself to his feet, most of his weight on the uninjured leg. "I think maybe I'll be okay."

Tiffany rose with him and gave him as level a gaze as her eight-inch shorter frame would allow. "I think so, too," she said as she helped him to the bed and summoned the recovery team.

But she wasn't so sure about herself.

In the hallway, she was surprised to find Dannette. A section of wall had turned transparent, offering a one-way window into the recovery room, where

a medic was now with the football player, prodding at his knee in the manner of doctors throughout time.

Dannette's eyes glistened, and this time, she made no effort to hide it.

"How long?" Tiffany asked. She'd had no idea the recovery-room walls could become windows, but it came as no great surprise. There'd been no sign of the view port from inside, but that didn't surprise her, either.

"Long enough. Laurel told me the story over breakfast, and I've been watching you ever since." Dannette pressed a napkin-wrapped package into Tiffany's hand. "I snagged you a muffin." She was still facing the one-way window. "It's not fair, is it?"

"No," Tiffany said. The time hunters really did pick the sensitive, caring, and—let's face it—handsome, ones. Never the misfits who might actually *enjoy* a future in which they could have their pick of women. No surprise there. Women of all eras would do the same. Men too, for that matter.

Tiffany's stomach gurgled at the smell of food, and she began unwrapping the muffin. Then she looked again through the window and stopped.

Dannette touched her forearm. "Don't," she said. "That's for you. You give . . . too much." She returned her eyes to the football player. "If he lets them, they'll treat him like a king."

Tiffany hesitated, then pulled off the remainder of the napkin and bit into the breakfast roll. "Why does it have to be this way?"

Dannette was still staring through the window. "I don't know. It didn't start with us."

"Yes. Ngawa told me about the plague." An unbidden thought crossed her mind. "Are the new guys at risk of catching it?" Randall was worried about his children, she remembered. His *boy* children.

Dannette was no longer looking through the window. "What exactly did she tell you?"

Tiffany recited what she remembered, suddenly aware of how little it was. A plague that killed most of the men, leaving a society in which males were in short supply. Men would have solved the problem with harems. Time snatches were a monogamistically female response.

"I've got to hand it to her," Dannette said. "She's really good with half-truths." She summoned up a digital chrono on the windowpane. "Crap. I go on shift in twenty minutes. Another three weeks planting 'puter records, this time in 2012. They've reserved me a return slot for about noon today. Debriefing shouldn't take more than a few hours. What say we talk about this at dinner? Say 18:00? Pick us something interesting; I'm sure I'll be in the mood for real food. Sorry I can't tell you more now, but if I start explaining, you'll ask so many questions I'll be late for costume-ing."

Dannette waved away both the chrono and the window, started to leave, then turned back to Tiffany. "And get some sleep. Call in sick or something. Tell them that one of these is *enough* for one day." She paused. "You might need that rest this evening. Me, I've got to do some thinking. But at least I've got the better part of a month to do it." She turned on her heel and walked briskly away.

Interesting food to Tiffany meant something different than to Dannette. "What the hell *is* this?" Dannette asked, staring at her plate.

"What, you mean you've spent all that time back in the past and never had a hamburger, fries, and a shake?" Tiffany had spotted the new auto-serve cafe several days ago: a rainbow of garish lighting framing an entrance to polka-dotted floors, cherry-red seats, checked napkins, and glossy tabletops—magic plastic teased into a very good replica of a 1950s diner. Well, actually, it was a replica of what twenty-first century nos-

algia believed a '50s diner ought to have looked like, but still, it was cheery, uncrowded, and offered the promise of real, old-fashioned food.

Tiffany looked happily at her own plate. "Pure indulgence—absolutely nothing good for you about it." Well, that wasn't quite true. The burger looked like tofu, the bun was whole wheat, the potatoes were "fiber fries," and the shake somehow managed to be "non-fat." But at least it *tasted* like the real thing. Or maybe Tiffany was so starved for grease she'd forgotten what it was supposed to taste like.

Dannette was examining the plastic basket in which the meal had been served. "What are we supposed to eat this with?"

Tiffany popped a fry in her mouth. Fiber or not, it wasn't bad. "Fingers." She licked them to demonstrate, grinning at Dannette's scowl. "And when did *we* become so civilized?"

Dannette tested her milkshake. "When *we* were supposedly taught twenty-first century manners."

"Ah," Tiffany said. "All rules have exceptions." She dealt with a drip of secret sauce that was threatening to fall in her lap. "Otherwise, what's the fun in life?"

Dannette's reaction startled her. She set down the milkshake and for a moment the old fire burned in her eyes. "You know, that's how I felt about hunting. It's such an adrenaline rush. However much preparation you've done, when the moment comes, it comes in a hurry, and you have to be willing to take risks. If you screw up, it's a royal mess—like bringing you here, only worse. Last week, a hunter snatched a guy in mid-air when he was taking a skydiving lesson. Did he wind up as one of yours?"

Tiffany shook her head. "But let me guess: he woke up thinking he was dead."

"Yeah. If we were to put the ones like that into a tunnel leading to a bright light, I bet Ngawa could convince them they're in heaven." Dannette gazed out

the door of the café. "It's just the type of thing she'd try." She switched back to Tiffany. "But I was talking about the hunter. Most likely, she couldn't pass up the opportunity to go skydiving. But what happened was that eight people went up and only six came down. I finally managed to create a record of a wind shear that might have blown the other two so far off course their bodies fell in a river and were somewhere downstream, feeding the fish. But that got the pilot sued by the quarry's parents for going too close to the river. I wanted to patch *that*—the poor guy didn't deserve it—but Ngawa wouldn't approve another trip. The woman really has no heart."

She finally picked up her hamburger and took a bite. "This," she said, "can't be healthy." A trace of a grin danced around the corners of her mouth. "The safe house I was in this time might cure even your craving for things like this. The folks in Research have come up with a new "Standard Twenty-first Century Diet" for people who spend all their time with computers: nothing but frozen pizza, chips, bad beer, and a boatload of something called Twinkies. I started to read one of the nutrition labels, then decided I didn't want to know. I swear I could *hear* my arteries hardening."

Tiffany remembered her first image of Dannette-the-Goth. "Your research department seems to pick up a lot of bad information. That pizza-and-Twinkie thing was always a caricature."

"Figures. Those guys probably got it from some old movie."

Tiffany set down her own burger and turned serious. "Okay," she said. "What gives? This morning you gave me all these mysterious hints, and now all you want to talk about is skydiving and Twinkies."

Dannette wiped an invisible something from the corner of her mouth. "You know," she said obliquely, "I'm really going to miss you."

"What?"

Dannette leaned back in her chair, savoring the moment. "I think I can get you home. Back where you can harden your arteries as much as you want."

"You've found a patch?"

"No. Something simpler. I think I can get you Outside."

Tiffany had despaired of ever seeing what lay beyond the plastic walls. Earlier that day, she'd even tried calling up windows at random, just to see if she could find one that overlooked anything beyond the confines of this artificial womb. But the wall had ignored her, just as it had when she'd tried to call up a 'puter port.

Still, what was the point? "I thought I'd cease to exist. Or destroy all of you in some giant flash."

"Who told you that?"

Tiffany laughed, but there was no humor in it. "Guess."

"Yeah. Well, it's another half-truth. The full truth is that we barely understand this technology. We didn't invent it. We stole it, and we've been playing catch-up ever since."

"What, you mean you've pirated someone else's invention?"

"No. Well, yes. But not the way you think. We stole it from the future." Dannette waved off Tiffany's question before it formed. "That plague Ngawa told you about? It hasn't happened yet. We're not sure when it *will* happen, but it's hundreds of years away. Perhaps more. All we're sure of is that we ourselves are being harvested by people three centuries in our future, which is about the optimum 'sporter range. At longer range, power consumption is too high. Closer to home, you get a lot of warp unless you're *really* careful who you pick." Dannette paused, gazing vaguely across Tiffany's shoulder. "Think of it this way. If you were to nab your own father, you'd have an unpatchable warp. Both of you would have to stay in the Bubble forever, and we're not even sure that would work. But if you nabbed your

great-great-great to the n^{th} grandfather, nothing much happens by the time the wrinkle gets to you. You're still you, even though a piece of your gene line should be missing."

Dannette poked at a fry, then wiped her fingers. "Did Ngawa tell you that story about the shifting mole?"

Tiffany nodded.

"It's one of her favorites. But it begs the real question, which is why her mole could shift but she, sadly, remains Ngawa. Temporal empiricists explain it with something they call chronological inertia. Philosophers and theologians call it conservation of souls. It's all fancy mumbo-jumbo for, 'We don't really know, but thankfully, it works.' Something similar applies to the world as a whole. Your generation and mine can lose millions of men to the future, but as long as everyone's reasonably careful about their quarry, and the patch teams do their jobs, the right things get invented, the population rebounds, and nothing much happens to the people doing the raiding. There's probably a lot of short-term sideslip in the twenty-second century, but by the time it reaches us, it all irons out in the wash."

Tiffany started to correct the mangled aphorism, then decided to let it go.

"The bottom line," Dannette continued, "is that you can pick short-range quarry if you're sure there's not going to be a lot of warp—people who wouldn't be missed no matter what—but it's a lot easier at longer range. That's why we're raiding your century, and that's why the twenty-seventh is raiding us. We have good reason to believe that they are being raided from the thirtieth, which may itself be being raided from even farther ahead. We're not sure how many iterations forward the process extends, but it could be quite a few." Dannette paused. "That's why your old boyfriend is so concerned about his kids. Not because they might catch the plague, but because when they're grown we'll still be in that optimum target range for our

friends in the twenty-seventh century. Although eventually, their crisis will pass, and presumably so will ours."

Tiffany struggled to imagine a succession of cultures raiding each other through time, the disturbance cycling backward like swells on a temporal sea. Talk about dancing to the tune of past mistakes: these people were dancing to the tune of the future's. "How do you know all this?"

"We caught a few of their hunters." Her eyes dropped. "Much as you nearly caught me. The 'sporters were easy to duplicate, even when we had no clue how they operated. At first, we thought we'd jump forward and try to negotiate with them, but 'sporters only work backward. It seems to be a warp thing."

"So if all you had to go on were a few stolen 'sporters, how did you manage to come up with all of"—Tiffany flapped a palm at their general surroundings—"this?"

Dannette puffed her cheeks in an imitation of her familiar snort. "Ngawa's father invented it. Supposedly. I was serious when I said he was somebody important. But the more patches I do, the more I suspect he was given the technology by a twenty-seventh century patch team: by controlling sideslip, the Bubble makes us less disruptive to them, too. Ngawa's father is a very good temporal theorist but it's hard to see how he could have achieved so much without help. Especially the warp monitors. They're about the size of a house and I'm not sure even he knows how they work. That's why arrivals are always in those domed rooms. The entire room is a monitor."

Tiffany took a deep breath. "So what happens if I step Outside? Presuming that you really do know a way to get me there. What keeps your world from ending or me from just vanishing? Is this chronological inertia *that* strong?"

"No. I spent as much as possible of the last three weeks reading up on theory, and mostly likely you indeed disap-

pear. I suspect that's what would have happened to that skydiver if he'd gone Outside before I patched him. But if the theory's right, you don't truly vanish—you rebound to your own time, releasing all that warp strain and producing most of the sideslip back there."

"Which means exactly what?"

"Damned if I know. The skydiver might have found himself truly dead—splattered into the ground with an unopened chute. You're probably more complex. Ngawa really is frightened of you. She's had you scanned every time you go into a retrieval room. Stacyn did a few of the scans, and she says the warp's been increasing."

"Why? I've never been anywhere but here."

"Ah, that's the billion-dollar question."

"Million. A billion was a *lot* of money."

"Million, then. But that's just what makes it baffling. Each time you say something like that, you decrease *my* potential warp by helping me blend in. But your warp keeps going up, so it has to be related to something else. I think it's from all the things you're learning about us, even though Ngawa's done her best to keep you from knowing any more than necessary for you to be of value to her. I know you don't do it for that reason, but each time you get one of those guys to cooperate, you save us a lot of time and money."

Dannette hesitated, gathering her thoughts. "There's only one reason I can come up with for why your warp might increase as you learn about us. I think that if we let you rebound, you'd *do* something with that knowledge. I think that's what Ngawa's worried about, and I'm willing to gamble that if she's afraid of it, it might be a good thing." She lowered her voice and leaned forward, even though they were alone. "Of course, there's a lot of risk involved. All of this is just theory—and theory we don't really understand, at that. But if you want to go home, now's the time to try it. Two days ago, Ngawa left for a meeting, and

she's not yet come back. As long as she's Outside, she won't be protected when the sideslip hits." The old intensity was back in her eyes. "I even know a way for her to take the blame."

"How's that?"

"You remember how surprised I was that Ngawa hadn't given you even basic 'puter access?"

Tiffany nodded. That entire evening would be hard to forget.

"Well, I think that's your ticket out of here. As long as the system really doesn't know you exist—and I checked it again a couple of hours ago and can't find you anywhere—you should simply be able to walk out, any time you want." She gave Tiffany a moment to digest that information, then continued. "That day when you asked me whether the walls eavesdropped, I didn't think to tell you that they do have one security duty: preventing unauthorized people from leaving. But if you don't exist, you can't be unauthorized."

"What if it's the reverse? That they only let authorized people get out? Then I'd be stuck, anyway."

Dannette's headshake was emphatic. "No; it has to be the other way. We have thousands of employees who tromp in and out at will. It's only the temporal staff who have to stay here, because we're the ones who accumulate warp. If you don't exist, you should be able to get out—and Ngawa's going to catch hell for not thinking of it."

It didn't prove to be quite that simple, of course. The stripped-down computer existence that allowed Tiffany to spend money and receive pages meant that the system actually did know who she was. "But that stuff uses only low-level files," Dannette told her. "We can simply delete you from them, and then you *really* won't exist."

They waited until the switchover from swing to graveyard shift—Tiffany found it amazing that those terms hadn't changed in three hundred years—

then went prowling for an unattended port in the retrieval wing, which, although still in use at night, was only lightly staffed. Theoretically, the job could be done by calling up a port somewhere private, but Dannette didn't want to leave traces on any account that could be linked to her. "If we do this right, it'll look like you did it yourself," she said. "Everyone will wonder how you figured it out, but I'll be happy to tell them how bright you are. You love to do that sit-and-listen thing where nobody realizes you're paying attention, when you're always two steps ahead of them. Ngawa's never figured it out. It'll be another screw in her coffin."

"Nail," Tiffany corrected automatically. "Coffins had nails."

"Gads, I'm going to miss you."

"Can you come visit? I've got this friend you'd really love."

"A guy?"

Tiffany laughed. "What, you're going to try to steal another one?" Then she realized how cruel that joke had been. "Sorry, I didn't mean it that way. See, you won't miss me as much as you thought. No, it's a girlfriend. You're a lot like her. Seriously, can you visit?"

Dannette pushed an errant strand of hair from her eyes. "Now *that's* a tempting idea. Way too risky, though, warpwisely." She paused, thinking. "But, maybe we can do something else. Let me think about it. Meanwhile, let's disappear you from the system."

An untraceable port was easy to find. Generally, ports were opened directly from a 'puter account, but even the simplest equipment often had the ability to create one of its own. Dannette found an empty medical bay and handed Tiffany a blood pressure cuff. "Here you go. Let's see how those arteries are faring."

Tiffany perched on an examining table and slipped on the cuff, watching the wall automatically open a port the moment the cuff was in place. As the device began squeezing her biceps, Dan-

nette opened a sub-window and flicked first to the V-phone directory, then to a system Tiffany didn't recognize. "This is it," she said. "Once I do this, we're committed. Still want to go home?"

Tiffany's heart was hammering hard enough that she must be producing weird results on the blood pressure monitor. Readings, she was sure, that would soon be scrutinized by people trying to figure out how she got away. She did her best to fake calm. "Let's do it."

"Keep taking BP readings, then, so this thing doesn't close down on me before I'm finished."

"How long will this take?"

Dannette was already flipping through menus so fast Tiffany couldn't keep track of them. "Not long. I had three weeks back in your century to figure it out. There's no security to crack because normally, if you tried to do this to someone, they'd just call up a port and restore the settings." Dannette's face was tense, though, and Tiffany wondered what she would say if someone stepped into the retrieval room. *Hi, we're just playing with this thing to see what it can do?* Yeah, right. Normal people don't do computer work with blood pressure cuffs.

Finally, Dannette stepped back. "That's it. You're history. By the way, this thing says you might be under stress."

"Tell me about it." The cuff released its grip, and Tiffany took it off. The port vanished. "Now what?"

"Now we find you an exit, and figure out how to open it."

"What! You mean you don't know how to do that?"

"A joke. Isn't that supposed to be a way to alleviate stress?"

Tiffany scooped off the examining room table and lowered her feet to the floor. Why did they always make those things for people six feet tall? "You're enjoying this, aren't you?"

"It does kind of bring back old times." Dannette leaned against the table, half-

sitting on it. *Ab, to be that tall*, Tiffany thought. "Actually, I do have a way. And a backup, though I'm not too fond of that one. All we have to do is get you to the rim. Any outer wall can become an exit. But first, let's make sure this worked." She faced the wall. "Map," she commanded, and a wall segment brightened into a detailed layout of the retrieval wing. "Now, you try it."

"What, I just ask for a map and one appears?"

"Yeah. You mean you didn't know you could do that?"

Tiffany shook her head.

"Sorry. That's another one that never crossed my mind. Even with your limited 'puter existence, you should have had access to these things. I lived on them during my first few weeks in this place. How'd you ever find your way around?"

"With difficulty," Tiffany admitted. She faced the nearest wall. "Map," she said in the closest approach she could manage to Dannette's casual command. Nothing happened. She tried again, more forcefully. "Map!" Still nothing.

"Good," Dannette said. "Now let's get out of here. It's probably best if we left separately." The tension was back. "It wouldn't be good for me if someone sees us together now." She turned back to her own map, scrolling to a distant part of the Bubble, then zooming in. "Let's meet here." Her finger stabbed a location in the maintenance section. "Think you can find it?"

"Give me a moment." Tiffany studied the map. "Yeah. I can do that." She hoped. She'd never been to Maintenance before, and on the map it appeared to be at least as bad a warren as Retrieval. In Maintenance, however, nobody would be likely to know either of them.

"Okay. I'll leave first. Find something to block the door open behind me, because it probably won't open for you."

Tiffany picked up the pressure cuff. "Will this do?"

"Perfect. Don't move it when you leave. That way, they'll presume you blocked the door open *before* erasing yourself from the system. I'd hate to leave them wondering how the hell you got out of a room you'd just locked yourself into."

"What about the map? Won't that give you away?"

"No." Dannette blanked the map port. "'Puter use leaves a trace. Maps don't. Only the walls know, and they're not allowed to remember. It's part of that anti-Big-Brother stuff I told you about."

Dannette turned to go, but Tiffany called her back. "Relax. You look like you're about to wrestle alligators. It's part of why I knew something was odd about you"—*all those years ago?*—"way back when."

Dannette closed her eyes and did some kind of breathing exercise. Her posture loosened, and suddenly she seemed smaller, more vulnerable. *Just how much of a risk is she taking on my behalf?* Tiffany wondered.

"Better?"

"Much. But don't try for too much nonchalance. That's not you, either."

Dannette turned to the door, which obligingly opened in her path. With an impressive demonstration of self-control, she stepped out without glancing right or left, turned, and was disappearing from sight as Tiffany stuck the cuff into the rapidly closing mechanism. For a moment, she thought it would be crushed, but some sensor kicked in the moment it felt an obstruction and the door came to rest with the cuff barely deformed by the pressure, like a bird held by a soft-mouthed retriever.

Tiffany waited a full minute, forcing herself to count off the seconds. When she finally moved toward the door, it not only wouldn't open for her, it resisted her first attempt to force it open. Panic reared, and she put her shoulder, back, and legs into it with adrenaline-fueled strength. Grudgingly, the door gave ground. She squeezed through and

watched its jaws slide back until they again cradled the fragile-looking pressure cuff.

The hallway was empty enough to remind her why graveyard shift had earned its name. She turned in the opposite direction from Dannette's and began working her way out of Retrieval and from there toward Maintenance, hoping she really had memorized the map well enough to find the meeting point.

The rim was a poorly defined location that shifted outward with each construction project. Maintenance was nearby—not surprising because it was here that supplies and shift workers came in and out. Tiffany was hoping to catch a glimpse of the mysterious machines that generated the temporal field pulsing through the outer walls, but was disappointed to find nothing but cavernous supply rooms that looked pretty much like twenty-first century warehouses: central storage for everything from foodstuffs to hardware and all the other oddments needed to keep a facility of this size running. Apparently, the temporal generators were elsewhere. She regretted not having known about the maps before, though she'd not really had much time for exploring.

Inside one large storeroom, a group of men were unloading supplies from delivery-truck-sized carts. Other warehouse doors were open, and Tiffany occasionally heard the rumbling of machines or the sound of distant voices. But the place was large enough to absorb a great many work teams, while still feeling comfortably isolated.

Dannette was waiting at the arranged location, which was simply an intersection of two major corridors. She'd pulled up a wall map and was pretending to examine it as Tiffany approached. "About time," she hissed. "The same six guys have come by here about three times. The first time, one whistled at me. The second time, another pinched my

butt, and last time, I got a 'You lost baby? I know where to show you a good time.'" She wagged her head in disgust. "Unfortunately, *that's* what the twenty-seventh century's been leaving us with." She gave a microscopic wince. "Which, of course, is what *we're* in the process of doing to you folks."

"So are those guys likely to put two and two together in the morning and report that you were here?"

"Are you kidding? Guys like that don't remember you in the morning even if you give them what they want. They figure that if they're the only game in town they can be whatever kind of jerks they want."

Tiffany hadn't thought to ask how many men Dannette's people had lost. Until recently she'd presumed it was virtually all of them, and the female-dominated Bubble had seemed to back that idea up. But the shortage probably dampened with each iteration, and a place like this would be female-dominated even if there were *lots* of men around. "Just how bad is this gender imbalance, anyway?"

"Overall, only a few percent. But that leaves us with a lot more single women than men—and too many of the men are idiots like those guys. Speaking of which, I think I hear them coming." The map port winked out. "This way."

She was barely quick enough. As Dannette led her into a side passage, Tiffany heard jocular voices and the whir of electric motors. Then the side passage branched into another, which shortly after reached a dead end. "That's it," Dannette said, pointing to the blank surface at the end of the corridor. "You're one doorway from freedom."

Tiffany wasn't sure what she expected, but the wall looked no different from any other: bland, white, magic plastic with no trace of the esoteric energies it conducted. Earlier, Tiffany had been working to keep Dannette from showing too much tension. Now her own pulse was again racing. Freedom,

failure, or true nonexistence? The next few moments would tell the story.

It was difficult to keep the fear out of her voice. "How do we get a door?"

"We just ask for it. Like calling up a port." Dannette pulled a device the size and shape of a cigarette lighter from her pocket and held it before the wall. "Exit," it commanded in Ngawa's most peremptory tone.

Dannette glanced at Tiffany. "Not only her voice print—recorded by me when she was yelling at me one day—but her full-body induction scan. I didn't know what I'd use it for when I recorded it, but this is perfect. As far as the wall can tell, Ngawa's standing right here with us." The wall shimmered and turned semi-transparent, in the process creating two archways, one on each end of a vestibule-sized tunnel. Beyond, the mysterious Outside revealed that graveyard shift really was in the middle of the night. Rather than the sunlight, sky, and green, growing things Tiffany had been quietly craving since she saw Randall's backyard, a pale, dimly lit surface spread before her, complexly striped with glowing pastel bands. It took a moment for her mind to adjust. Then she realized that it was an enormous parking lot, surfaced in some relative of magic plastic.

Tiffany's chest tightened. It didn't look like home, but it was the pathway to it. How ironic that both journeys would begin in parking lots. She turned back to Dannette, remembering the odd duck who'd accidentally drawn her so far from home. The now-familiar face no longer looked exotic, and the eyes glinted with almost-tears. But both the face and the eyes still held the same fierce determination. "It's like an airlock," Dannette said. "That shimmering light is the temporal barrier. There's one at each end of the lock, so the Bubble's always fully contained. Just walk normally through both of them. You won't feel anything unless it rejects you. Then it's like walking into a trampoline. It'll stiffen but not so quickly you get hurt." Dan-

nette paused, searching her memory. "Oh, you're not carrying anything valuable, are you?"

Tiffany shook her head.

"Good. It's also an anti-pilfering system. Unobtrusive but effective."

Even at night, Outside was a very busy place. Several giant trucks were moving through the lot, bearing the logo of some nameless supplier. Or maybe it was the Bubble's own logo. Tiffany never had learned much about this place's organizational structure. She turned back to Dannette. "You really can't visit me?"

Dannette wore sadness with the awkwardness of one unaccustomed to showing weakness. "Not possible," was all she let herself say, followed by, "Go." Outside, a truck was moving toward what appeared to be a loading dock, although the curve of the building obscured most of the structure from view. "But I might find a way to get you a message," she added.

"Do that," Tiffany said. She hugged Dannette, who responded stiffly—more unaccustomed behavior?—then Tiffany released her, steeled herself to step forward—and watched the exit disappear.

"What the hell?" said Dannette. She pulled the cigarette-lighter device back out of her pocket. "Exit," Ngawa's voice commanded again, with all the resonance of real life.

Nothing happened.

Dannette fiddled with the device and tried a second time, again with no result. Then, like wind spilled from the sails of a mishandled boat, her trademark vitality faded, leaving a slender, defeated woman. "Dumb," she said. "Really, really dumb. Ngawa's out of the building, and even though they aren't really designed for that kind of security, the walls figured it out. I could still use this to call up an *entry* but not an *exit*." Her voice became flatter, even more defeated. "Time for plan B."

She stuffed the device back into her pocket and suddenly Tiffany knew what

plan B had to be. "No!" she said before Dannette could summon up an exit in her own name. "I can't let you do that!"

As long as Tiffany had known her, Dannette had been one to fling herself headlong against obstacles—the win-or-die-trying approach. Stymied, she didn't know how to fight back with finesse. Now, there was no emotion at all in her voice. "You have to go. Staying here does nobody any good. Whatever it is that Ngawa's afraid of back there, go do it. This was always my backup plan." But she was facing Tiffany, not the wall, and there was still time to argue.

"Wait," Tiffany said, remembering the giant trucks. "What does the system know about us, *right now*?"

"Nothing much. I doubt the shutdown involved a security program, and nobody unauthorized actually tried to walk through the field. Most likely, some error-correction subroutine simply saw a contradiction and cured it. The only thing the system is likely to remember is that Ngawa called up an exit—which is what I wanted it to remember. But it doesn't matter." Dannette's feistiness was returning, but now it was directed toward Tiffany. "We're stuck with the fact that you don't exist. I can't undo that. *Right now*, you can't even get into your dorm room let alone open an exit. What do you want to do, hide down here with the rats, stealing breadcrumbs from the day workers?"

Dannette started to turn back to the wall, but Tiffany stepped in front of her—not that this would actually stop her from opening an exit. But it did slow her down. "Don't," she said. "There's another way. Those supply teams that have been feeding you Twinkies and pizza? They've been seeing a lot of old movies, but when I was a kid, I watched the *right* old movies."

This time, the plan went off with only minor hitches. Tiffany took the lead, doubling back to the junction where she and Dannette had previously met.

They waited a few minutes, ducking into a side corridor when a trio of men drove by on electric tractors, pulling piles of boxes stacked on wheeled, flatbed pallets. "That looks inefficient," Tiffany said. "Why don't they just drive the big trucks in here?"

Dannette shrugged. "It must have something to do with the maximum-size timelock you can put in an unsupported temporal field. Not my specialty."

What Tiffany really wanted was something the size of a delivery truck, but she found something nearly as good a few minutes later, when the next group of inbound flatbed pallets was trailed by a vehicle like a tiny pickup truck. "That's it," she said. "Think you can catch him on the way back?"

"For sure. That's the team of guys who hassled me before. If they stay on schedule, they'll unload and be back in about ten minutes."

Tiffany bit her lip. "Time to do your thing then."

Dannette nodded. "Don't worry. I was *made* for this."

Tiffany stepped into the hallway and sought out another niche, between Dannette and the warehouse. A few minutes later, Dannette stepped into view and summoned a map. From her hidey hole, Tiffany watched as her friend lounged in the empty corridor, leaning against the wall. Then there was a whir of distant motors and Dannette went into action. She turned to the map and leaned forward to study it, the angle of her lean accenting the shape of her buttocks, a hand braced on a knee to relieve the strain on her back. It looked awkward, but then, so did the poses in most men's magazines.

As the motors drew closer, Dannette added a pout and put a puzzled finger to her lips. Tiffany feared she might be overdoing it, but then the carts were passing by and she pressed herself farther back into her side passage. She'd be seen if anyone looked that way, but the cacophony of catcalls and "hey, baby"s

ANALOG

that came as the progression of carts braked to a halt told her that all eyes were elsewhere.

Several of the men dismounted, including the driver of the miniature pickup truck. "I think she really is lost," one said.

"Not as lost as *you*," Dannette replied, and the man, who might actually have been offering help, was the focus of everyone's attention.

"She got you good with that one, Zeck," one of his companions said. "But we know you love it."

"Good for him, 'cause that's the only lovin' he's gonna get," Dannette said.

"Ooh, she's got a real tongue on her." This time the speaker was the pickup truck driver.

Dannette wheeled on him. "Better than what you *don't* have."

The chorus of yucks this produced told Tiffany her time had come. Three centuries hadn't changed much about the hey-baby types—though the ability to call up an emergency V-phone did mean the game could no longer get out of hand. Tiffany slipped out of her side passage and ran to the back of the electric truck.

"Ah, you wouldn't be sayin' that if you gave it a try there, girly," the driver responded. From the reactions of his companions he must have supplemented this with a crude gesture.

There wasn't anything to hide beneath, but Tiffany didn't need to hide for long, so she slithered over the tailgate and dropped out of sight. *I'm going to miss you, too*, she thought, as Dannette issued a final insult that must have left the driver blushing as his buddies laughed with renewed intensity. There was the sound of footsteps. Ahead, motors whirled, then the truck lurched under the weight of the returning driver. "Snarfin' fancy bitch," he muttered. Then they were moving.

Tiffany wished she dared to sneak a final peek out the back of the truck to wave goodbye to her friend. But getting

caught now would be the end to everything. She wasn't sure exactly what Ngawa would do to her, but life imprisonment wasn't beyond the pale. Or maybe they *did* execute people who deliberately tried to produce sideslip. It had to be a pretty major crime.

The drive to the vehicle exit took less than five minutes, but seemed to stretch forever. Along the way, they passed other vehicles fanning out from the loading dock, but Tiffany huddled low and nobody saw her. Her confidence grew, and she again began thinking beyond the simple task of getting to the exit. What would happen if she managed to do so without being caught? She was relying on theory to send her home, but maybe she'd end up in the twenty-seventh century, instead. And if she did get home and wound up back in the parking lot, what exactly would she say to Brenda? *Hi, sorry I was gone so long?* Or would she have been gone at all? For that matter, was the theory correct, or was she simply moving toward her own death? Whatever was in store, it would be nice if the little truck would move faster and get it over with.

Then, something shimmered and Tiffany realized they were in the lock. The truck never slowed. She braced herself, saw a second shimmering wall rising toward the lock's ten-foot ceiling, and then . . . nothing. No falling into the void, no desire to scream: merely nothing.

She again awoke to darkness, but this time it was warm, gray, and comforting. Even before she opened her eyes, she knew she was lying in—or more precisely, on top of—her own bed. A dog barked, and two blocks away a revved-up engine protested on the four-lane thoroughfare that ensured that no realtor would ever describe her neighborhood as quiet. Beside her, the numerals of her alarm clock flicked from 3:17 A.M. to 3:18 A.M., but the intrusions of the city at night had never been more

welcome.

In the street-lamp glow filtering through her curtain, it appeared that she was wearing the slacks, sweater, and shoes she remembered putting on that morning, more than three hundred years in the future. But were they also the same clothes she'd worn to that fateful coffee meeting with Brenda? She'd not had much time for shopping in the twenty-fourth century, and she'd worn this outfit quite a few times. Had any of it been real?

Her stomach murmured and Tiffany realized she'd never finished her hamburger dinner. Real hunger or imagined, she owed herself a glass of milk.

The moment she opened the refrigerator, she knew it hadn't been a dream. The sour odor was a slap in the face, and when she cautiously hefted the half-full milk carton, she felt not the slosh of liquid, but the jiggle of something the consistency of cottage cheese. Or maybe Jell-o. She chose not to find out which. Near the milk was something that might once have been cheese, plus a sandwich bag holding a rounded lump festooned in fuzzy colors. Even the apples in the fruit drawer were beginning to wrinkle and shrink like old-man faces.

Tiffany swung the refrigerator door shut, but the odor now polluted the entire kitchen. Retreating to the living room, she switched on the TV and searched for an infomercial-free channel that might display the date.

She found one, and momentarily her heart stopped. April was gone. So were May, June, July, and the rest of the summer. The preview channel was trumpeting a new season of shows she'd never heard of, and stark letters at the bottom of the screen proclaimed it to be September 17. She had been gone for nearly five months. Or was it a year and five months? No, it had to be less than a year. Overdraft protection on her bank account and automatic rent and utility payments would have saved her from

eviction for five months, but not seventeen.

So this is sideslip, she thought as she kicked off her shoes and padded back to bed. *I wonder what else is in store?*

She found out in the morning, when she booted up her computer. "You have mail," it announced. It whirled for a disturbingly long moment, then informed her that there were 3,759 items in her in-basket. She thought about deleting them all, unread, but some would be "where have you been?" notes she *had* to answer if she ever figured out what to say. Amnesia? A whirlwind romance in Outer Mongolia? Once she picked a story, she'd have to live with it.

Starting with the oldest, she scrolled through the messages, deleting them in batches. She didn't answer any of the personal notes, even ones from Brenda. Deleting junk mail was calming—the first normal thing she'd done in months.

After an hour, she took a break. She threw away the entire contents of the refrigerator, wiped down the empty shelves with disinfectant, and—suddenly sympathetic with Dannette's attitude about canned food and pasta—coaxed her car into life for a trip to the supermarket. It was as hard to imagine that Dannette was hundreds of years from being born as it had been, months before, to picture Brenda, centuries dead.

After lunch, she returned to sorting e-mail. She had most of it eliminated when she found a message from time-girl2327. The subject line read, "I found a way!"

"Welcome back," the message read.

"I'm on patch duty a few months back from you, and realized I could just plant a message to be delivered to you in the future. When I get home, I'll look for your answer. Just hit 'reply,' and don't worry if your server says it's undeliverable—I'll still find it.

"Your escape worked. They found the exit opened under Ngawa's name and

presumed you'd walked out before the error-correction closed it. You're now viewed as pretty brilliant, if I do say so myself. Ngawa came back with memory holes. She didn't remember you and had forgotten that she hated me until she checked her files. Then she told me I'd be on patch duty forever. It seems that back when I nabbed you, she did something that somehow backfired. Which, of course, she blamed on me. If I ever find out the details, I'll let you know, but when she realized that she'd not told me before, she clammed up again. So she's still Ngawa, maybe even more so.

"At first, she talked of sending a hunter to 'sport you back here, but her father intervened and told her to leave it be. More advice from the future, or just common sense? It never crossed my mind that she'd consider something so insane. The sideslip has already occurred. Nabbing you again would just create a new warp. Even Ngawa should have seen that, but when she gets angry she forgets to *think*. Apparently, her father really slapped her down. Maybe I shouldn't be so hard on her? Nah—I ran from my father; I didn't *become* him.

"I've not seen any other sideslip here, but something interesting appears to be going on uptime. Do you remember that outfit in my future that I said was taking fifteen million a year from yours? Well, they're now down to five million. So far, nobody else seems to have noticed.

"I've got a sabbatical coming, but I've decided to stay here for the time being. I probably should go out there and face my father, but I'm not ready—yet. And I need my spare time for research. If I have anything to say about it, I really *am* going to run that uptime outfit someday and, well, after meeting you, I've decided that maybe smaller is better. If you have any ideas toward that end, pass them on.

"Let me know if you get this.—D"

Tiffany read the letter three times. Did it make her feel more or less at home?

Or did she now have two homes, one here and one in the future? She was simultaneously energized and too tired to write at length. "Got back last night," she typed. "Haven't done anything yet. My advice: male babies. You'll still get raided, but you won't need to take as many from us. If the folks in the Twenty-Seventh get the same idea, maybe you can work a bigger sideslip upstream." *That's what Ngawa was afraid of*, Tiffany thought. *I'm helping Dannette undermine the entire system.*

Eventually, some generation would have to deal with that future plague, but that was their problem, and there was no excuse for the disturbance to reverberate through so many iterations. It was just like Dannette and her father, or Brenda and her adolescent tormenters. Or maybe the whole world always worked that way. The moment she'd seen Randall, Tiffany had realized the same thing could happen to her. Having him vanish so suddenly, like one of those guys who goes out with you once, then never calls back, hadn't yet made her cynical, but it had made her doubt her ability to judge character.

She resumed typing. "If you have to take men, try to pick the sad, lonely ones and make them happy.—P.S., you can have as many of the yahoos as you want."

Then she called Brenda. Or tried to. Brenda wasn't home, and didn't pick up her cell phone, either. Tiffany left "guess what, I'm back" messages on both phones, then busied herself trying to create the least flaky reason she could imagine for her absence. Brenda, on the other hand, deserved the truth, or as much of it as Tiffany dared tell her. Brenda had friends in the technology industry, and Tiffany didn't want them inventing brew-to-order beers or magic plastic years ahead of schedule.

Brenda didn't call until evening. "Where have you been?!" she demanded, almost before Tiffany had gotten the phone to her ear. "I thought I'd never

ee you again!"

"The future," Tiffany answered simply. He then sketched a bare-bones summary of the Bubble culture, with its hunters, patchers, archives, and shifting hostages of men. *Futures inflicting their woes on the past, generation to generation.*

Brenda accepted everything without comment. "The best I'd come up with," he said when Tiffany finished, "was that you'd gotten involved in some really nasty secret agent stuff and they'd made you vanish—rather exotically, at that. Either that or it was, 'Beam me up, Scotty.'" She laughed. "So I've been right all along. There really *are* no more good men."

"Not 'no more,'" Tiffany said. "But definitely fewer."

"Fewer, schmewer. That's why I was ate getting back to you. I was out with his doofus who thinks a woman's job is to wear a skimpy bikini and lounge around the deck of his yacht. Okay, so he's a rich doofus. But he kept wanting me to be more skimpy."

Tiffany cradled the phone against her ear and relaxed, listening to her friend prattle on about men, as though the intervening months hadn't existed. The excuses, the remaining e-mail, the job she probably no longer had—all of that would work itself out. Tiffany was home.

A few days later, Brenda took a vacation. "Long overdo," was all she'd say. When she came back, she and Tiffany met for coffee for the first time since Tiffany's return. But it wasn't quite like old times because Brenda brought a friend.

"Tiff, this is Wadsworth Huffington," she said. "I call him Wads, but he doesn't really like it."

"Charmed," Wads said, sweeping off a beret and kissing her hand. Nobody had ever kissed Tiffany's hand before. His moustache tickled. "Miss Brewster has told me so many wonderful things

about you."

Tiffany glanced at Brenda. "Miss Brewster?"

Brenda smiled sweetly. "Wads is a bit old-fashioned. His uncle was a prince or duke or something, and he's just full of old-world charm."

"Not a prince, my sweetkins," Wadsworth said. His accent was upper-crust British. "I do wish you would get that right. There really is a rather large difference."

Brenda nudged Tiffany. "Isn't he delightful?"

Tiffany pulled Brenda closer to her. "Where on Earth did you get him? Is he some kind of actor you latched onto to feed your sick fantasies?"

Brenda looked hurt. "No way," she said. "Wads, tell Tiffany how we met."

Wadsworth gave her a glance. "The real story?"

Brenda nodded.

"Right-o," he said. "Or I suppose that the proper expression is okay. I always had a gift for languages, but this American vernacular is rather difficult. But to start at the beginning, it had been a truly astoundingly dull day. A dull year, for that matter. A country gentleman's life isn't all it's cracked up to be, and I never had any taste for business. Maybe—"

Brenda nudged him in the ribs. "Remember what I told you about time being money, Wads?"

Wadsworth grimaced. "Yes, you Americans have always been a rather *basty* lot. All right . . . uh, okay. I was on the bridle path, exercising my favorite hunter at a brisk trot; when your friend Miss Brewster just sort of—I guess the word would be *plopped*—out of a tree, like a luscious, ripe peach falling gently to the ground." Wadsworth beamed at her and Brenda beamed back.

"I hadn't quite figured out the altitude control," Brenda said, still smiling cloyingly at Wadsworth. She pried her attention from Wads and turned back to Tiffany. "I don't think I told you what a stir you created when you pulled your

vanishing act. I mean, you took a big scallop of the parking lot with you, plus half a car and the base of a street lamp. The rest of the lamp fell down on about three other cars, so we were kind of afloat for a while in cops and disturbed citizens. Then this whole group of odd-looking women showed up, a lot like the one you'd chased out the door, all trying to snoop around and overhear what people were saying to the police. Some of your buddies from the future?"

"Sounds like it." This must have been Ngawa's study team. *I bet she panicked and cobbled together the team from whoever was available*, Tiffany thought. *Who then made a bash of it, so she blamed Dannette. It certainly sounded like Ngawa.*

"It was all very confused," Brenda said, "and the cops didn't like it at all, especially because your divot looked a lot like a bomb crater except that its edges were too smooth and nobody could find any of the debris." She grinned. "Which made it a pretty damn weird bomb crater." She looked out the window, reconstructing her memory. "Anyway, the women eventually started to walk away, though they didn't look happy."

Yeah, Tiffany thought. They were going to have to tell Ngawa they'd accomplished nothing. Nobody could look forward to that.

Brenda was still talking. "Then all of a sudden they stopped. One was pawing frantically through her purse—you know, the way you do when you're so desperate you can't see what you're looking for even if it's right in front of you? But the cops were watching, so the women quieted down and left for good. An hour or two later, most of the cops had left, but I was still hoping that maybe you just *might* pop back from wherever you went . . . or fearing that someone would find your body . . ."

"Sorry," Tiffany said. "I worried about you, too."

Brenda started to speak, then bit her

lip. Wads delicately took her hand, but said nothing. Brenda squeezed his hand in return, then resumed her story. "About that time, another woman arrived. She was a lot more discrete, but she couldn't find what she was looking for, either." Brenda opened her purse so Tiffany could see the handle of a device that didn't look as much like a pistol as she'd once thought it did. More like a hair drier with too many buttons. "That's because I'd already found it. I'd had various theories of what it might be, but when you told me about time snatches, it all fell into place. So I figured that if they were stealing from us, we'd just have to steal from someone else."

Tiffany looked at Wads. "So you just went back to what, 1910 England, and grabbed him?"

"A bit earlier, actually. He was rather advanced for his era."

"And he went along with this?"

Brenda nodded. "I just put on my best Jane Austen act and let him court me. After we'd had a few nice chats, I told him where I really came from and that I'd hunted him up from the obituaries, where he'd come across as a nice guy who'd not done much, then died young of a heart attack. He wasn't all that thrilled by that description, particularly the part about dying young, but he perked up when I told him that in our time, that was easy to fix." She turned back to Wads. "Right, sweetkins?"

"Yes," he said. "Although I don't think I will ever get used to this tofu substance you insist on feeding me." His glance wandered out the window, just as a young woman in cycling shorts and an athletic top passed through his line of vision. His eyes swiveled, then averted. "Zounds," he said, and even Brenda raised her eyebrows at that one.

Brenda slid the purloined 'sporter over to Tiffany. "Want to give it a try? It's loads of fun. Once you're done, maybe we can make more. It looks like the whole thing was designed to be maintainable back here if needed, which

means we ought to be able to build one from scratch. Just think: we could be Tiffany and Brenda's Lonely Hearts Mended Club."

Tiffany stared at the device. To all appearances, Brenda had found a good man, and Tiffany envied her for that. But in her mind's eye, she saw women with eyestalk hairdos walking into the coffee shop. Bare-midriffed cyclists descending on Napoleonic France. French women, armed with their own stolen 'sporters, chasing men farther backward in time, until the 'sporter batteries ran down and stranded them somewhere awful, burned at the stake for witchcraft.

Wadsworth talked old-fashioned, but he wasn't stupid. "Intriguing choice, is it not?" he said, and Tiffany knew what she had to do.

Brenda had no idea how lucky she'd been. To Wads, this was a grand adventure. But most men, even relieved of a deadly heart condition, wouldn't be so chipper. Tiffany knew. Her dreams were haunted by a football player, huddled in

on himself, tears staining her shirt-sleeve. How long would it be until Tiffany was asking Dannette to send plans for a twenty-first century Bubble?

"Intriguing, yes," she said. "Difficult, no." She rocked back her chair far enough to raise the front legs off the floor. Before Brenda could protest, she shoved the 'sporter beneath one of the legs. "Sorry," she said. "This ends here." Then she rocked firmly forward, hard enough to produce a satisfying crunch. For good measure, she did it again, making sure the fragile circuit boards were thoroughly smashed.

Nearby, a group of men looked up from a table covered with texts and notebooks.

Brenda's shock passed, and a brief smile flitted across her lips. "I take it you had a really great time off in the future," she said, *sotto voce*. Then she turned to the fall semester's new group of chiropractors. "Hi," she said. "My friend here is kind of shy, but she's been wondering what you're studying ..." ■

IN TIMES TO COME

Our March 2005 issue features a mixed bag of stories light and dark, by authors old and new. A highlight, of course, is Part II of Jack Williamson's *The Stonehenge Gate*, but we'll also introduce a promising newcomer or two, along with stories by more familiar names like James Glass and Carl Frederick. "Acts of Conscience," Shane Tourtellotte's latest entry in his "First Impressions" series, raises the particularly intriguing dilemma: what if conscience itself can be chosen?

The prolific and popular Richard A. Lovett is back yet again, this time with nonfiction on "The Prehistory of Global Change." There is much consternation in the world today about the possibility that we're on the brink of a worldwide climate shift. That may be, and it may be inconvenient—but don't kid yourself that it's new!

IT'S ANALAB TIME AGAIN

**YOUR BALLOT WILL BE AUTOMATICALLY ENTERED IN OUR
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Welcome to the year 2005! As usual, we're asking you to choose your favorites via the Analytical Laboratory. Not only will your votes provide tangible awards for authors and artists, but your feedback will help guide the selections we offer you in the future. Your vote is important!

Look over all your copies of Analog dated 2004, or refer to the index on the following pages. Pick your three favorites in each of the following categories: novella, novelette, short story, science fact article, and cover. If you're not sure about a piece's category, you'll find it listed both in the Table of Contents for the issue in which it appeared, and in the Index. In the event of a disagreement between the Table of Contents and the Index, the Index should be considered correct. List your choices in order of preference (your favorite in each category is #1) on the ballot below, and either mail it in or send it by e-mail. You can also vote at our website, www.analogsf.com. The ballot is intended to make it easier for you to vote, but if you don't want to cut it out, feel free to copy it.

To be sure your vote counts, please have it reach us by **January 31, 2005**.

Please, only vote once! Thank you very much!

Votes via snail mail: AnLab, Analog, 475 Park Avenue South, Fl 11, New York, NY 10016-6901.

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3. _____

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1. _____
2. _____
3. _____

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2004 Index

Here is the Index to 2004, Analog's Volume 124. Entries are arranged alphabetically by author, followed by the month of publication and the page on which the entry originally appeared. When the author's name and/or part of the entry's title is omitted, it is the same as that of the previous entry. Multiple entries by the same author are listed alphabetically according to the story/article title. Collaborations are listed under all authors with cross references. Unless otherwise noted, each entry is identified as an Alternate View (av), editorial (ed), fact article (fa), guest editorial (ge), novella (na), novelette (nt), poem (pm), Probability Zero (pz), serial (ser), special feature (sf), or short story (ss).

Anderson, Kevin J.— The Bistro of Alternate Realities (ss) Jun 84	D'Ammassa, Dan— Fore-Thought (pz) May 64
Andrews, Arian— What Engineers Know (pz) Nov 44	Dulski, Thomas R.— To Emily on the Ecliptic (na) Jul/Aug 162
Baxter, Steven— PeriAndry's Quest (nt) Jun 100	Easton, Tom— The Reference Library Jan/Feb 230
Belyeu, Sherilyn Schofield— The Aztec Supremacist (ss) Apr 75	_____ Mar 132
Brady, Kenneth— Baby on Board (na) Dec 8	_____ Apr 134
Bratman, Steven— Deletion (nt) Mar 180	_____ May 132
Buckley, Bob— The Dragon Wore Trousers (ss) Jan/Feb 174	_____ Jun 132
Fool Efficient (ss) Jul/Aug 150	_____ Jul/Aug 230
Burns, Stephen L.— Short Line Loco (nt) Jan/Feb 69	_____ Sep 134
Burstein, Michael A.— Decisions (ss) Jan/Feb 151	_____ Oct 132
Time Ablaze (na) Jun 8	_____ Nov 134
Carter, Scott William— The Liberators (ss) Apr 62	_____ Dec 132
Clarke, J. Brian— In Spare (nt) Apr 34	Elgin, Suzette Haden— Honor is Golden (ss) May 76
Cooper, Brenda— Savant Songs (ss) Dec 68	Flynn, Michael F.— The Clapping Hands of God (nt) Jul/Aug 70
Cramer, John G.— A Farewell to Copenhagen? (av) Dec 62	Frederic, Carl— The Fruitcake Genome (ss) Dec 48
Introducing the Pentaquark (av) Mar 82	Misunderstanding Twelve (ss) Apr 78
Left-Handed Materials— Super-Resolution Optics? Oct 84	Fyfe, Carol Johnson— Whispers (pm) Oct 83
Neutrino News: SNO, KamLAND, and WMAP (av) Jul/Aug 146	Gaubatz, William A.— Focusing Visions and Goals For Opening Space Dec 40
The Sound of the Big Bang (av) May 66	(with Yoji Kondo)
Creek, David— Unbound (ss) Sep 84	Gillett, Ph.D., Stephen L.— The Fifth Biorevolution (fa) Sep 32
	Glass, James C.— The Color of Pain (nt) Mar 116
	Gunn, James— Elixer (nt) May 8

Haldeman, Joe— Camouflage (ser) (Part 1 of 3) Mar 10 (Part 2 of 3) Apr 92 (Part 3 of 3) May 86	Nov 144 Dec 144
Hanson, Amy Axt— Trophies and Treasures (nt) Sep 8 (with Jerry Olton)	
Hecht, Jeff— Draft Dodger's Rag (nt) Mar 86	
Hemry, John G.— Small Moments in Time (ss) Dec 78	
Kelley, Laura M.— We Are Legend: The Social Consequences of the AIDS Crisis (fa) Oct 44	
Kirkland, Kyle— Artificial Chromosomes for Gene Therapy and Designer Babies (sf) Mar 50 Caged (nt) Jan/Feb 69 Dear Analog: A History of Brass Tacks (sf) Jul/Aug 136	
Kondo, Yoji— Focusing Visions and Goals For Opening Space Dec 40 (with William A. Gaubatz)	
Kooistra, Jeffery D.— Edward Teller, R.I.P. (av) Apr 58 How Much Can One Man Matter? (av) Nov 62 In Regards to the Bova Letter (av) Jun 78 Odds and Ends #3 (av) Jan/Feb 102 Problem Is ...? (av) Sep 80	
Lai, Gary— Hot-Air Ballooning Through Space: The Promise of Mini-Magnetospheric Plasma Propulsion Jan/Feb 40	
Landis, Geoffrey A.— Rules of Engineering Projects (sf) .. Apr 89	
Latner, Alexis Glynn— Blu 97-032D (ss) Jun 64	
Lazzaro, Joe— Artificial Vision and the "Kite and Key" Experiment (fa) .. Jul/Aug 58	
Levites, Kevin— The Test (pz) Dec 61	
Lewis, Anthony— Upcoming Events Jan/Feb 240 Mar 144 Apr 144 May 144 Jun 144 Jul/Aug 240 Sep 144 Oct 144	
Lovett, Richard A.— Caretaker (ss) Jun 92 Cosmic Seismology: The Big Science of Minor Shake-ups (fa) Apr 24 Distant Fire (ss) Mar 108 Fat Mice, Eating Machines, and Biochemical Treason (fa) ... Nov 34 Promises (nt) May 38 The Transience of Memory (sf) Jun 38 Weapon of Mass Distraction (nt) ... Jan/Feb 127	
MacIntyre, F. Gwynplaine— Annual Annular Annals (ss) Jan/Feb 162	
Manison, Pete D.— Tea with Vicky (nt) Apr 9	
Ming, Marie— Swings (ss) Jan/Feb 86	
Molvray, Mia— Promises, Promises (pz) Mar 102	
Moscoe, Mike— The Strange Redemption of Sister Mary Ann Nov 54 What Wise Men Seek (nt) Dec 110	
Muller, Edward— Gun Control (ss) Nov 46	
Nevala-Lee, Alec— Inversus (nt) Jan/Feb 200	
Niven, Larry— Storm Front (ss) Mar 99	
Nordley, G. David— Harpoon (ss) May 54	
Olton, Jerry— Damned If You Don't (ss) May 70 Trophies and Treasures (nt) Sep 8 (with Amy Axt Hanson) The Uncommon Cold (ss) Mar 104	
Plante, Brian— Dibs (ss) Apr 51	
Raymond, Eric S.— Open Minds, Open Source (fa) Jul/Aug 100	
Rollins, Grey— The Bambi Project (ss) Dec 56 Greater Fleas Have Lesser Fleas (nt) Mar 60 On the Tip of My Tongue (nt) Jun 46 Private Eyes (nt) Jan/Feb 49	
Rusch, Kristine Kathryn— Paparazzi of Dreams (nt) Nov 72	
Sakers, Don— The Slow Train (ss) Oct 72	

Sawyer, Robert J.— Shed Skin (ss)	Jan/Feb	138	Moreau ² (nt)	Jul/Aug	110
Schembrie, Joe— A Plague of Ruins (nt)	Dec	90	Stewart, Guy— Warning! Warning! (pz)	Oct	88
The First Martion (ss)	Sep	43	Throop, Kelvin— Do Unto Others (pz)	Jun	82
Scherrer, Robert— Equivalence Principle (pz)	Jan/Feb	100	Turzillo, Mary A.— An Old-Fashioned Martian Girl (ser)		
Extra Innings (ss)	Nov	66	(Part 1 of 4)	Jul/Aug	10
Schmidt, Stanley— A Billion Big Brothers (ed)	Apr	4	(Part 2 of 4)	Sep	90
Achilles' Grid (ed)	Mar	4	(Part 3 of 4)	Oct	90
Attack of the Giant Oxymorons (ed)	Nov	4	(Part 4 of 4)	Nov	92
Do All Roads Lead? (ed)	May	4	Utley, Steven— Babel (ss)	Mar	75
Is There a Doctor on the Planet? (ed)	Sep	4	Vajra, Rajnar— Viewschool (nt)	Sep	50
The Price of Freedom (ed)	Jul/Aug	4	Layna's Mirror (na)	Oct	10
Spreading the Word (ed)	Jan/Feb	4	The Ghost Within (nt)	Nov	8
Top Predator (ed)	Dec	4	Wheeler, Ramona Louise— Inherit the Vortex (nt)	Jan/Feb	10
The Vanishing Repairman (ed)	Oct	4	Zimring, K.J.— The Future of Transplantation (fa)	May	30
Who Needs Company? (ed)	Jun	4			
Shaffer, Catherine H.— Midnight on Tabula (nt)	Oct	54			
Sharrah, J.T.— Greetings from Kudesh (nt)	Jun	114			
Sparhawk, Bud— Clay's Pride (na)	Jul/Aug	194			
Steele, Allen M.—					

No man is good enough to govern another man without that other's consent.

—Abraham Lincoln

Failure is instructive. The person who thinks learns quite as much from his failures as from his successes.

—John Dewey

THE REFERENCE LIBRARY Tom Easton

Iron Sunrise, Charles Stross, Ace, \$23.95, 355 pp. (ISBN: 0-441-01159-4).

Cusp, Robert A. Metzger, Ace, \$24.95, 528 pp. (ISBN: 0-441-01241-8).

Crucible, Nancy Kress, Tor, \$24.95, 384 pp. (ISBN: 0-765-30688-3).

Flash, L. E. Modesitt, Jr., Tor, \$25.95, 480 pp. (ISBN: 0-765-31128-3).

Marque and Reprisal, Elizabeth Moon, Ballantine Del Rey, \$24.95, 324 pp. (ISBN: 0-345-44758-1).

Prince of Christler-Coke, Neal Barrett, Jr., Golden Gryphon, \$25.95, 244 pp. (ISBN: 1-930846-28-2).

Sleeping in Flame, Jonathan Carroll, TOR, \$13.95, 302 pp. (ISBN: 0-765-31186-0).

The Edge Chronicles: Beyond the Deep Woods and **Stormchaser**, Paul Stewart and Chris Riddell, David Fickling Books, \$12.95 each, 278 and 385 pp. (ISBNs: 0-385-75068-4 and 0-385-75070-6).

Tequila Mockingbird, Nick Pollotta, Wildside, \$15.95, 156 pp. (ISBN: 0-809500-55-8).

Charles Stross introduced in *Singularity Sky* (reviewed here in January-February 2004) the idea of the Eschaton, an AI emerged from Earth's networks with vast enough powers to scatter humanity across thousands of worlds, each one of which got a parcel of folks defined by affinity. In **Iron Sunrise**, we learn that New Dresden got Serbs and the like, which led in due time to a series of violent wars and a nasty dictatorship. Moscow—named for the burg in Idaho, not the other one—got a bunch of boringly cooperative Midwesterners and produced a pretty benign world. Not that they never got into arguments with the neighbors. There's a little trade dispute going on with New Dresden, and then parties unknown turn Moscow's sun into a small nova. And Moscow's momentarily surviving defenses have unleashed the retaliation ships maintained just in case of such disaster.

Meet Victoria Strowger, age seventeen, who calls herself Wednesday. She and

her folks live on a Moscow space station, and they're being evacuated before the nova's blast front—the "iron sunrise" of the title—arrives to fry all flesh. But she's bored, she's gone crawling around through the evacuation ship's ductwork, she's found something odd, and now there's a killhound on her tail. Fortunately, she has an invisible friend named Herman, who has been coaching her for years on how to play spy games. She manages to survive the immediate crisis, but it isn't long before her parents are dead and she's running again, using a bit of cash Herman put in her account to hop a liner elsewhere.

Remember Herman? We met him first in *Singularity Sky*. He's an AI agent of the Eschaton, and in the earlier book he was running Martin Springfield, a starship drive engineer whose secret mission was to queer attempts to defy the Eschaton's ban on anything resembling time travel. He teamed up with UN agent Rachel Mansour, they married, and now they're being dispatched to solve a

Moscow-related crisis. The just-in-case retaliation ships maintained by Moscow (and other worlds, for that matter) can be recalled after launch if enough of the surviving ambassadors of the destroyed world issue the recall code. Unfortunately, Moscow's ambassadors are being murdered in sometimes strange ways (in one case the body was decorated with a clown nose). And the timing suggests the murderer is riding a starship from world to world, hopping off just long enough to do the wet work, and then proceeding to the next part of the job.

Funny thing, the ship in question is the same one Wednesday's on. There is a group of ReMastered (who kill by brain-wiping and can turn a victim into a puppet) aboard. There's a journalist who has bad memories of what the ReMastered did on a world called Newpeace. And there is the ship's entertainer, Svengali the clown.

What's going on? It's complicated, but Stross reveals early on that the ReMastered are schemers out to take over as many worlds as possible. They're ruthless, too—but are they ruthless enough to destroy a world? There's no obvious motive, but they have factions and as the pieces come together, the truth emerges.

The only thing Stross doesn't tell us is what Wednesday will do next. I suspect she will have a role to play in a future book. She's an appealing heroine, and it would be a waste to drop her after her first outing.

Will there be another book? I'd bet on it. Stross is so good at modern space-opera, in fact, that I wish there were a way to reserve a copy.

In 2031, according to Robert A. Metzger, the sun will turn into a rocket engine. At the same time, vast structures will emerge from the interior of the Earth, two four-kilometer high rings, one around the equator, one from pole to pole, cutting the Earth into quadrants. The result is geological upheavals, sea

level changes, and millions dead. Total global ecosystem collapse is only three weeks off.

A sinister figure, General Thomas Sutherland, is in charge of finding an answer, and he seems strangely sure of himself. And perhaps he should be, for twenty years later, the main characters are still there, augmented by genetic engineers, a strange AI known as the Swirl, Simon Ryan, a "Tool" (meaning a human with internal enhancements, one of which is a simulation of Bill Gates' persona) who is being used in a controlled effort to leap into the Post-Human future, to breach the Point (a.k.a. Vinge's Singularity and Broderick's Spike), and Sutherland's daughter Sarah, who is about to leap from atop one of the daisy-like structures that have grown from the crests of the walls. She leaps, whispers, "Don't fail me, Daddy," and dies.

Except she doesn't. She is revived, and then she is merged with a powerful quantum computer known as CUSP, short for Controllable Universal Sentient Plasma. Perhaps not surprisingly, the "Controllable" part of the name turns out to be a cosmic joke. Sarah instantly goes Post-Point.

Meanwhile Adebisi Akandi is entering Phobos as an ambassador to the colony of dinosaurs within and learning that Alpha Centauri A is surrounded by a ring of 237 planets. That solar rocket seems designed to add Earth to the ring.

What's going on? And what if anything can be done about it? That's what *Cusp* is all about, and Metzger has plenty more to toss into the mix before he's done. Scope and sweep enough for any three novels by other writers. Great sawunda in a classic vein, colored by the very latest scitech developments. Give Metzger a little more time, and he'll be asking Benford, Pournelle, Niven, both Vinges, and maybe even Clarke and Heinlein to shove over.

Nancy Kress's *Crossfire* (reviewed here in June 2003) introduced a strange

world. Jake Holman, a lawyer with a checkered past, had led an assortment of wealthy folks away from a troubled, crowded Earth to colonize the world of Greentrees, which was more purple than green, but was blessed with a wealth of resources and a dearth of troubles. There were natives of a sort, the Furs, but it was soon clear that they too were alien to Greentrees. In fact, they had been planted by the fungoid Vines, who had tweaked Fur genes in search of a change that would rob them of the ferocity that made them implacable enemies of the Vines. When the Furs showed up, they killed the tweaked Furs (as abominations) and did their best to wipe out the humans. But the Vines helped, and before long a couple of humans, Karim and Lucy, were on their way with an infectious virus that would pacify all Furs everywhere.

Crucible is the sequel. Karim and Lucy have delivered their payload and are now stranded on a Vine world, wondering how the heck they can convince their hosts to send them home. On Greentrees, a couple of generations have passed and people have gotten used to a world of peace and plenty (though the technology the colonists brought with them is wearing out). It is dominated by the descendants of those who came with money, and others are rebellious, but by and large it is a world free of Earth's politics, schemes, and plots. Jake is still around, though he is old and feeble. The colony's leaders include Alexandra Cutler, tray-o or Technology Resource Allocation officer. And when the ship *Crucible* arrives from Earth, its captain, Julian Martin, proves to be as smooth as they come.

It's a classic confrontation of the city slicker with the rural innocents. It doesn't take long for Julian to get Alex into his bed, nor to convince Greentrees that the colony needs a defense department, complete with martial law. This seems wise enough when the Furs show up, this time clad in spacesuits as if to shield

against contamination, and start collecting females from the wild furs that still remain. It looks like they're trying to rebuild Fur society. But then they destroy the colonists' city and other facilities. They clearly want to rebuild on Greentrees, and they *don't* want neighbors! Unfortunately, Julian's nasty side is coming clear. Fortunately, a remote research station has found something that looks a lot like Vines deep underground.

And while the Furs are burning off the planet's life, Julian is hunting for those who would reveal his true intentions, including Alex. Is there a solution? The good guys have to win, of course, but Kress doesn't tell you how until the very end.

As usual, she does a fine job. She also leaves open the possibility of a sequel in which the remarkably xenophobic Furs—or the Wild ones that remain on Greentrees—become allies of the humans. It will be interesting to see how she creates a multispecies society from the ashes of war—if that is in fact her plan.

In *Archform: Beauty* (reviewed very positively here in November 2002), L. E. Modesitt, Jr., introduced the idea of "rezpop"—popular music with an emotion-boosting "resonance" feature. It was being used in advertising, and politicians were beginning to test it out. Now, in **Flash**, Modesitt gives us Jonat deVrai, a media consultant who specializes in analyzing the effectiveness of product placement or prod (which long ago replaced the sorts of advertisements we are used to, which were killed by the clicker). Life is quiet, disturbed only by the need to hustle to keep the consulting gigs coming in and by his sister, who thinks it's high time he remarried. But then he is asked by the Centre for Societal Research to do an unbiased, scholarly report on the use of rez and prod in political campaigns. Soon thereafter he is dodging assassins, there are hints that androids cloned from his DNA are up to

no good, his sister and her husband are killed by one of those androids (leaving him with two small children to care for), and the local police AI is asking him to set it up with a separate hardware base.

Modesitt is clear from the start that there are plots afoot. Multinational corporations are after power on Earth and on Mars, where they want to crush a secession movement. deVrai is intended as a pawn, but he is an ex-Marine who years before resigned rather than continue dealing with ethical problems. He kept his enhancements, he maintains his fitness, and the assassins have *no* idea what they're dealing with. The result is a thriller with a thoughtful core that will appeal to Modesitt's fans, and if there are any *Analog* readers who have not yet joined that group, here is an excellent chance to discover what Modesitt does.

If there is a defect, it lies in the surfeit of acronyms and the lack of a cast list at the beginning of the book.

Elizabeth Moon introduced doughty heroine Kylara Vatta in *Trading in Danger* (reviewed here in March 2004). Ky, born to her clan's destiny of interstellar trade, went off to the military academy instead. Alas, she proved to have too much sympathy for underdogs for her own good and got expelled. The clan shuffled her offstage as captain of a decrepit tradeship, her mission to deliver it to the junkyard. But she got to thinking independent thoughts, got involved in a pirate-mercenary war, and emerged ready to turn independent—and thereby live up to her heritage as a Vatta. I said at the time that “before long she'll be involved in military action,” and I wasn't wrong.

Volume 2 of the saga is **Marque and Reprisal**, which opens with an apparent attempt to steal from her ship. Jump home to Slotter Key and the near-total destruction of the Vatta clan and trading empire. Someone has it in for them, and they can lean on the government to make sure it doesn't investigate too

hard. Ky doesn't hear about this right away, for FTL communications are down. But she can tell something is up, especially when she receives a package containing a Slotter Key letter of marque and reprisal, authorizing her to be a privateer (which most think is a mite too close to pirate). She doesn't use it, however, being too engaged in fighting off assassins and rescuing marooned family members. Before long Stella Vatta shows up, and Rafe, a ne'er-do-well out of Stella's past who knows much more than he should and perhaps enough to figure out what is really going on, is helping the escape from trouble. Enter the mercenaries, and for awhile Ky has her own little space force. But the mercenaries won't work with privateers. As soon as she decides to take a prize, she's on her own.

But that prize! She is now well equipped to carry on the task of reprisal. Volume three will surely carry the mission on, with the big question being just what will happen between Ky and Rafe.

We haven't seen much from Neal Barrett, Jr., for awhile, but now he has reworked some material from the early nineties and given us **Prince of Christler-Coke**. The style is initially a bit off-putting, for the characters dine on “Wyne and jellied lahm. Slick eel sandwiches and klams” and are waited on hand and foot by “perky servant flunks from overseas. Leggy Hunns and Britts. Chesty Lahps and Sweedes.” But you get used to it quickly as part of the flavor of a future feudalized America where corporate clans—the Christler-Cokes, Disney-Dows, Jockey-Visas, and the like own it all, leave literacy to the lower classes, and live lives of golden ease. But as the titular prince, Asel, faces his wedding day to the lovely Loreli Pepsicoma-Dodge, whose chief appeal is her nice pair of whoopers, black choppers fill the sky. Soon Asel's family is dead and he is on his way to the National Executive Re-

habilitation Facility (NERF) in Dry Rock, Oklahomer, to dine cafeteria-style and wear Poly Hester suits.

First a very hostile takeover. Then enforced middleclassdom. So déclassé! But Asel is made of sterner stuff than most members of his class. Soon he and Sylvan Lee McCree, a person of color from America South, are on the run and encountering an appalling amount of fourth-world poverty, not to mention Phil the talking robotic bear, the Nones of Our Lady of Reluctant Desire (OLORD), a mall full of robot shoppers, and in due time a suitable rebellion.

No, Asel isn't a hero. He's along for the edification. He has to meet folks who differ in class and color and background and learn that they are decent people. He also has to learn a bit about responsibility, and then, perhaps, he will be able to help the world become a better place.

Amusing in a way familiar to Barrett fans, but even they may wish he had chosen more current targets for his barbs.

Jonathan Carroll writes some very strange fantasy. I reviewed his *The Wood-en Sea* in the July-August 2001 issue. Now Tor has reissued his earlier novel, **Sleeping in Flame**, and even though it's now seventeen years old, I couldn't resist. Carroll writes beautifully solid prose about genuine and likable characters. And then he takes them off in some very bizarre directions.

Walker Easterling is a screenwriter and actor who lives in Vienna. He and his director friend, Nicholas Sylvian, make small films, some of which do well on the festival circuit. After Walker's divorce, Nicholas introduces him to Maris York, and before long Walker is being called Rednaxela by a weird bicyclist on the street and mysterious old ladies at the cemetery. He starts seeing the future and dreaming of other lives, and on a trip to California he is introduced to a strange fellow named Venasque, who

says he teaches people to fly. He learns of a dead look-alike, Moritz Benedict, whose father had such a pathological attachment that when Moritz grew up and discovered women, he killed his son. And he finds a connection with a particular Grimm fairy tale.

Both Nicholas and Venasque die, but Venasque still manages to give Walker essential advice: Those dreams of other lives are important. They are real past lives. Moritz was you, and yes, he really did meet me in German-occupied France, when I was a schoolteacher and he was collecting Jews for the trains. Understand your lives, recover your magic, and if you can just figure out who your father is, perhaps you can save Maris, save your son, save yourself. At least until the blonde in the red cape shows up at the door . . .

Give Jonathan Carroll a try. You'll be glad you did.

Here's something for the kids: **The Edge Chronicles**, "an action-packed, fantasy adventure series for middle-grade readers" written by Paul Stewart and quite charmingly illustrated by Chris Riddell, first appeared in England in 1998 and has seen ten volumes of success there. The first two volumes are now available in America, and they promise a good deal of fun for kids who love Harry Potter and the like. **Beyond the Deep Woods** introduces Twig, a foundling raised by woodtrolls and blessed (or cursed) by a tendency to stray from the path. This leads him into several sorts of alarming trouble with spindlebugs, rotsuckers, and termagant-trogs before he finally finds his father, Cloud Wolf, a sky pirate captain. In **Stormchaser**, he begins his adventures with his father, but when Cloud Wolf gets a dangerous mission—to retrieve a cargo of the magical stormphrax (solidified lightning)—he is left ashore. But not for long!

Kids will love the bizarre touches, the bold contrasts of good and evil, and

Twig's struggle to fit in. And parents will be relieved to know that there is nothing suggestive to make them worry about suitability.

Nick Pollotta has a fair reputation for SF humor, as *That Darn Squid God* (reviewed here in April 2004) showed. Now he gives us a collection of short stories, **Tequila Mockingbird**, framed by a radio interview wherein the author takes over the mike and reads everything aloud, beginning with "Upgrading," in which an MIB-type hunter of supernatural evil conspires to become a vam-

pire on the grounds that he will get more active-duty time than in his present status. In "The Collar," a gun-happy, blow-'em-away Mike Shane clone discovers that there are such things as demons. And if that's true, the other side must be just as real. Hmm, he thinks, better mend my ways. "The Really Final Solution" suggests that the only truly worthy adversary for Sherlock Holmes was Dr. Watson. "Initiation" shows how Pollotta's popular Bureau-13 series began. And "Millennium Knights" is a classic Feghoot in modern drag.

Not major stuff, but fun. ■

All men should strive to learn before they die, what they are running from, and to, and why.

—James Thurber

A definition is no proof.

—William Pinkney

Dear Stan,

I am trying to figure out why you allowed such a "tree-hugging" story as "Caretaker" to be published in *Analog*. Clearly the ending of the story was to hit us over the head with the morality that the existence of a tree is as important as a human being, hence the killing of innocent lives aboard the colony ship at the end of the story. This is not the first extreme, left-wing tripe that has been printed in your magazine, and I want to know why you think *Analog* should be a soap-box forum. Science Fiction is about the exploration and exploitation of space and planets to insure the existence of mankind into the far future. Mr. Lovett believes that we should be stuck in a corner of space so a far-off, the planet can be labeled an intergalactic park. This short story was not a fable to make us think, but a political statement regarding our own exploration and exploitation of this great planet, Earth, for the betterment of our existence.

Jacob Morris
Beverly Hills, CA

Dear Mr. Schmidt:

J. T. Sharrah's story, "Greetings from Kudesch," was quite well written and affecting. However, I found the ending troubling and disappointing. The author seems to imply that we will still be suffering with religious fanaticism in the distant future, and worse, that it will engender respect. Purely from the standpoint of the story and its excellently drawn characters, I have great difficulty believing that Donald Mackenzie would

have allowed Naomi to go through with her ritual suicide. He clearly cared for her, and certainly did not share either her misguided beliefs, nor those of the aliens. To remain in character, he would either have forcibly removed her, or at least contacted the Terran authorities to come get her. Even if he could not stop her, I certainly can't believe that, while expressing condolences, he would have told Naomi's parents that they should "be proud" of their daughter for doing something that he would regard as shocking, irrational, wasteful, horrible, etc. Surely the pride is felt by the author, not the character.

Perhaps the author shares Naomi's belief system. But I would hope that religious fanaticism, whether it is demonstrated by Moslems flying airplanes into buildings, or Hindus killing Moslems in India, or an orthodox Jew shooting into a mosque, or Buddhist monks setting themselves on fire, or Christians burning heretics (or themselves) would be a thing of the past by the time humans are routinely visiting other planets.

Dennis Chamot
Burke, Virginia

Dear Mr. Schmidt:

Jeffery Kooistra's response to Ben Bova's letter in the June 2004 issue ranges over a number of areas. However, the key point seems to me to be that Kooistra believes that there is some positive evidence that supports UFO research. But he wobbles back and forth. At the end of his article he argues that while "I certainly don't think any evidence I've seen constitutes proof of ex-

traterrestrial visitation [no evidence], some of the evidence *is* [his italics] reasonably solid." (Some evidence.) A few lines later, after disclaiming his advocacy of UFO claims, he says that the "UFO community has gathered up more evidence in support of its mission than has the SETI community." (Evidence.) Then he argues that "Most of it is crappy evidence. Its better than nothing, which is all SETI has to show, but not much better than nothing." (Not really evidence?)

My question for Mr. Kooistra is what non-crappy evidence is there for the existence of extraterrestrial visitors based on reported sightings of UFOs? SETI investigators are looking for evidence of intelligent life. They are not making claims based on crappy evidence. The lack of positive evidence does not mean that the search cannot result in proof of the existence of intelligent life beyond the solar system, though one can argue (or not) that the failure to produce positive results may be a basis for reducing or eliminating funding support for such efforts. But that has nothing to do with the quality of the evidence. Mr. Kooistra does not seem to understand the difference.

Kenneth Pearlman
Worthington, OH

Dear Dr. Schmidt,

Well, he's done it again. Mr. Kooistra's writing just always seems to confound. And so, I found his "Alternate View: In Regards To The Bova letter" (June, 2004, pgs. 78-80) confounding, confusing, and seemingly self-contradictory.

At one point he seems to argue that scientists do not start with the null hypothesis, but rather look to "find proof." On the face of it, this seems to show a lack of understanding of the scientific method and the value of using a well defined null hypothesis. Put simply, there are an infinite number of ways that two things can differ, but only one way that they can be equal. Given this, it is easier to begin with a well defined set of ex-

pectations and try to demonstrate that two things are dissimilar. It is very hard to prove that two things are the same since a small, but real, difference may always be hidden in the noise associated with any set of measurements. Thus many scientists use the null hypothesis as a tool of the scientific method that allows them to make progress by disproving things. Mr. Kooistra seems to be displaying a shocking lack of understanding of this aspect of the scientific method, but then comes the confusing part.

Later in the same article, Mr. Kooistra raises the differences between what he calls "evidence" and "proof," which on the other face of it seems to imply that he understands the value of not throwing out evidence just because it does not fit your favorite model of the week. He goes on to suggest that a mass of "evidence" may not be proof. Well and good. But it is because most so-called "evidence" *is* garbage that the scientific method should be used. A good hypothesis makes specific and testable predictions, and a poor hypothesis makes vague ones that are not easily tested. If Mr. Kooistra feels that the evidence for the existence of UFOs is solid, then what can he propose as a further test? If he cannot propose such a test, then perhaps, as he states later in apparent contradiction of his earlier assessment, the evidence is indeed "crappy".

Given that mounds of "crappy" evidence can be amassed with a simple Google search, where does Mr. Kooistra's consideration of such information get us? Cutting through such a mess is when a clear application of the scientific method is called for! But it can only be done if the method is applied correctly. Starting out with "crappy evidence" is okay, but to not make use of null hypotheses seems likely to hamstring the attempt at the start!

Once again, I am shocked (shocked!) by Mr. Kooistra's writing. I am still not sure if I disagree with his views, or if his

writing is so unclear that I am having trouble understanding it.

Scott T. Meissner
Ithaca, N. Y.

Dear Stan,

Jeffery D. Kooistra (The Alternate View, June 2004) seems baffled at the claims and positions taken by Michael Shermer and Ben Bova. These people are obviously neither stupid nor ignorant, so how can they be so wrong? They must be *careless*—what else can it be?

Kooistra writes that Shermer lists “low quality evidence” as one of the UFOlogists “techniques,” then seems stunned that Shermer cannot distinguish between techniques and evidence. Kooistra complains that Shermer makes the false claim that SETI scientists start with a null hypothesis, while UFOlogists assume what they are out to prove. He points out (quite correctly) that scientists as a rule don’t investigate matters for which no evidence exists (these are infinite). If SETI does so (and it does), there is an implicit presumption that the investigation is worth making even in the absence of evidence.

But Shermer (at least as I read him) was using the shorthand of our common vernacular. What he says distinguishes SETI researchers from UFO researchers is a technique of utmost importance—that of setting appropriate *standards of evidence*. Low-quality evidence is of course not a technique; the technique of accepting such evidence is crucial.

Kooistra says that SETI and UFO researchers “use an *identical* form of reasoning to justify the *reasonableness* of their research pursuits.” At one level, this is true. But then, why have the UFO researchers found so much evidence, while the SETI folks have found none? The answer lies in what is considered “evidence” in the first place. Perhaps if “UFO researchers” were put in charge of decoding the input from the Arecibo

telescope, they would apply “bible code” techniques to “find” whatever congenial hidden messages lurk in the noise. Whether their findings are evidence or only the side-effect of applying a technique is a semantic distinction. Both groups of researchers quite strongly desire to find what they’re searching for. One group finds what isn’t there, the other does not. The *reason* for this distinction is profound.

Kooistra writes “I’m sure with some polite conversation over coffee and via close questioning, I could get even the most enthusiastic of these [UFO] people to admit that the number of sightings doesn’t actually *prove* their case—they were just being careless in the use of their language.”

And *that* statement, frankly, shocks me. Has Mr. Kooistra spent much time making such an attempt? If he did, he’d quickly learn the distinction between the religious and scientific approaches. UFOlogy resembles a religion, in that UFOs piloted by aliens are defined to exist. The evidence is window dressing, since evidence is irrelevant to definitions. Mr. Kooistra would quickly discover that his “polite conversation” would remain polite only until the True Believer realized that Kooistra was neither a fellow believer nor a ready convert. The exceptions within the UFO community (perhaps “cult” would be a better term) are in the small minority.

Perhaps Shermer would have communicated with Kooistra better by saying that some UFOlogists “know” alien spaceships visit us *a priori*, a presumption SETI researchers do not make. Shermer and Bova’s skepticism is neither imprecise nor sloppy. They simply assumed that their readers would understand not only the vast difference in the acceptable standards any evidence must meet, but the *reason* such different standards are applied.

Flint Cowden
Huntsville, AL ■

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21-23 January 2005

ARISIA (Boston Speculative Fiction conference) at Boston Park Plaza Hotel and Towers, Boston MA. Guest of Honor: Barbara Hambly. Artist Guest of Honor: WETA FX. Fan Guest of Honor: Victor J. Raymond. Media Guest of Honor: Harry Knowles. Info: www.arisia.org; info@arisia.org; Arisia, Inc., 1 Kendall Sq., PMB 322, Bldg. 600, Cambridge MA 02139.

21-23 January 2005

31 FLAVORS OF CONFUSION (Michigan area SF conference) at Troy Marriott, Troy MI. Guests of Honor: Emma Bull, Will Shetterly. Artist Guest of Honor: Derek Grime. Science Guest of Honor: Christian Ready. Fan Guests of Honor: David G. Hartwell, Kathryn Cramer. TM: Steven Brust. Registration: \$30 until 15 December 2004, \$40 at door (checks to AASFA). Info: www.stilyagi.org/cons/2005/index.html; ConFusion@stilyagi.org; ConFusion 31, Box 8284, Ann Arbor, MI 48107.

28-30 January 2005

VERICON 5 (Harvard SF conference) at Harvard University, Cambridge MA.

Guests: Vincent Baker, Mike Carey, Brian Clevinger, Luke Crane, Peter David, Eric Katz, Jared Sorenson, Tad Wadsworth. Info: www.vericon.org; conchair@vericon.org.

10-13 February 2005

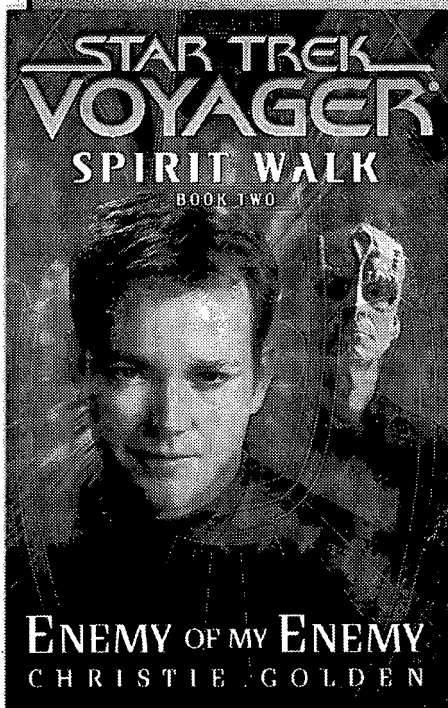
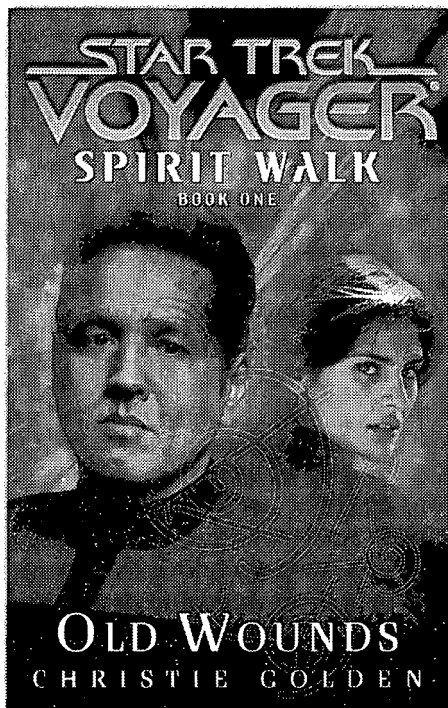
CAPRICON 25: MAD SCIENTISTS (Chicago area SF conference) at Sheraton Chicago Northwest, Arlington Heights IL. Guest of Honor: James P. Hogan. Artist Guest of Honor: Shaenon K. Garrity. Fan Guest of Honor: John Morse. Registration: \$40 until 15 January 2005, \$70 at door. Info: www.capricon.org/capricon25/index.html; info@capricon.org; Capricon 25, Box 60085, Chicago IL 60660.

18-20 February 2005

BOSKONE 42 (New England Regional SF conference) at Sheraton Boston Hotel, Boston MA. Guest of Honor: Orson Scott Card. Official Artist: Alan Pollack. Special Guest: Mike Glycer. Featured Filkers: Urban Tapestry. Registration: \$42 until 21 January 2005. Info: www.boskone.org; info@boskone.org; (617) 776-3243 (fax); Boskone 42, Box 809, Framingham MA 01701.

25-27 February 2005

SHEVACON 13 2005 (Virginia area SF conference) at Roanoke Tanglewood, Roanoke VA. Guest of Honor: L.E. Modesitt, Jr. Artist Guest of Honor: Tim Hildebrandt. MC: Rikk Jacobs. Registration: \$25 until 1 February 2005, \$30 at door. Info: www.shevacon.org; smith1104@ntelos.net; SheVaCon, Box 416, Verona VA 24482-0416. ■



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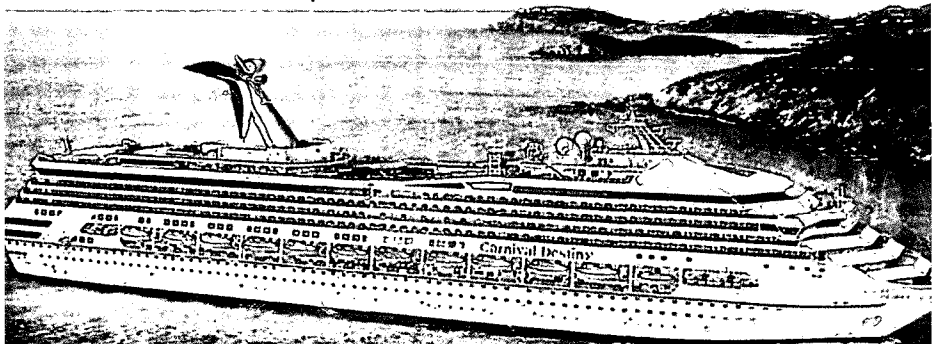
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